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The Celebration of Anniversaries Recalls the History of the Times of Their Inception, Brings Us into Touch with the Active Participants in the Event or the Discovery Being Memorialized and Interprets the Facts Relating Thereto.

Vol. XIX, No. 11 NOVEMBER, 1930

JOURNAL

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

CONTENTS

Frontispiece and Sketch—C. B. Jordan 1163
Editorial:
Individuality in Medicine and Pharmacy 1164
The Significance of Anniversaries 1165
Chicago World's Fair Centennial Celebration 1167
French Colonial Exposition 1168
The Local Secretary for the 1931 A. Ph. A. Meeting, at Miami 1168
The American Pharmaceutical Association and Canadian Pharmaceutical Association Will Meet in Toronto, in 1932 1170
Retrospect of Fifty Years Ago 1170
Scientific Section:
Preparation of Carstanjen's Compound—Harwood 1171
The Ultraviolet Transmission of Liquids—Harvey 1173
A Study of the Toxic Properties of Diethylphthalate—Blickensdorfer and Templeton 1179
The Effect of Buffering the Outer Phase upon the Stability of Certain Emulsions—Krantz, Jr. 1181
The Leaf Oils of Washington Conifers: III. Pinus Monticola—Lehman and Lynn 1185
A Study of Tincture of Capsicum—Poe, Wyss and Slater 1188
Assays of Some Official Iron Preparations Containing Organic Matter—Briggs 1191
Bibliography of Pharmaceutical Research—DuMez 1199
The Importance of Physiological Chemistry in Modern Professional Pharmacy—Riggs 1201
The Extent and Use of Former Pharmacopœial Products—Cook and Frank 1205
Character and Purpose of the United States Pharmacopœia—Beal 1215
The Stabilization of Solution of Arsenous and Mercuric Iodide, U. S. P. X—Husa and Enz 1228
Teacher-Training in Pharmacy—Motley 1230
Department of Business Management:
Why People Prefer the Pharmacist—Olsen 1232
The Department of the National Association of Boards of Pharmacy:
President Hankins Appoints Committees 1235
State Board News 1236
A Few Problems in the Education of a Pharmacist—Biddle 1238
The Department of the American Association of Colleges of Pharmacy:
The Teaching of Botany—Plitt 1241
The Teaching of Pharmacognosy—Bacon 1242
Alexander Nicolaus Scherer—Kremers 1245
Miami Preparing for the A. Ph. A. Convention—Christensen 1248
Pharmacy Week Report—Ruth 1252
News Bulletins of the Drug Trade Bureau of Public Information 1253
American Registered Pharmacists Association 1253
Proceedings of the Local Branches 1255
Editorial Notes 1261
Personal and News Items 1265
Obituary 1267
Societies and Colleges 1270
Legal and Legislative 1272
Book Notices and Reviews 1273
Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.
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THE 79th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN MIAMI, FLA., DURING WEEK OF JULY 28th. HEADQUARTERS, COLUMBUS HOTEL. LOCAL SECRETARY, G. H. GROMMET, 2364 S.W. 11th ST., MIAMI.

The 1931 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries and of Pharmaceutical Law Enforcement Officials will also be held at Miami, same time and place. The Plant Science Seminar will be held at Gainesville, Fla., during the week of July 21st.

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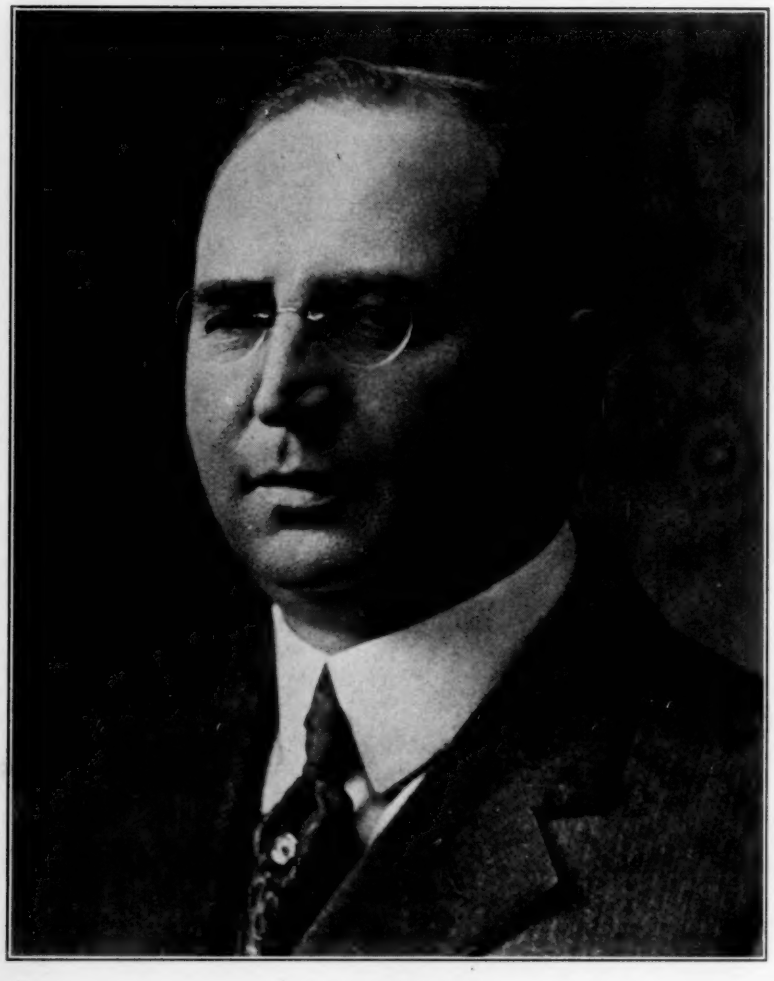
ON the development of drugs and their uses depend to a considerable degree the health and the welfare of the people of the world. Daily our laboratories are engaged in the pursuit of newer knowledge which will make constantly more effective the unending combat against illness and disease. The pharmacists of our country are indispensable allies of the physicians. It is fitting, therefore, that each year we should formally acknowledge our indebtedness to them. I am glad to extend to the pharmacists of the nation the good wishes of all our people.

HERBERT HOOVER.

The President's estimate of pharmacy and the value of Pharmacy Week.



C. B. JORDAN.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XIX NOVEMBER, 1930 No. 11

THE CHAIRMAN OF THE HOUSE OF DELEGATES, A. PH. A.

The Chairman of the House of Delegates has for many years taken an active part in state and national pharmaceutical association meetings and is a strong advocate of higher pharmaceutical education, with the aim in all of his work—to raise pharmacy to a plane of high professional standing. In 1912 he introduced the subject of prerequisite legislation to Indiana Pharmaceutical Association; at which time the proposition received little support, but he is persistent when convinced that his cause is worth while; as a result, in 1918, the plan was adopted by the ASSOCIATION.

Charles Bernard Jordan is a native of the "Lake State;" he was born on a farm near Morrice on November 7, 1878, where he received his early education, and graduated from high school in 1897. Thereafter, he taught in the country schools and grades at Morrice until 1900, when he entered the State Normal College at Ypsilanti, from which institution he was graduated in 1904 and, in the same year, was made Superintendent of Schools at Ypsilanti.

As a young man, while attending Morrice High School, and as teacher, he gained practical experience in the drug store of W. A. Conley. He entered the School of Pharmacy, University of Michigan, in 1908 and, in 1910, received the degree of Pharmaceutical Chemist and Bachelor of Science and, two years later, that of Master of Science from the same institution.

He was made director of Purdue University School of Pharmacy, September 1910, and, later, advanced to Dean, an office he still holds. In 1930 his efforts of past years were crowned with success by the completion and dedication of the Pharmacy Building of Purdue University.

Dean Jordan was secretary of the Section on Education and Legislation, A. PH. A., 1916–1917, and its chairman during the following year. Last year he was vice-chairman of the House of Delegates and this year he was elected to the chairmanship. He was president of the American Association of Colleges of Pharmacy in 1918–1919 and has been chairman of its Executive Committee since 1923.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

INDIVIDUALITY IN MEDICINE AND PHARMACY.

DR. JOHN MORGAN impressed American medicine and pharmacy by his firm conviction that the same individual should not engage in both the application and preparation of medicine. He conscientiously practiced what he advocated, even though his prior experience as apothecary qualified him for practicing pharmacy. He gave not only educational reasons for his stand, but also pointed out the dangers that obtain in attempting both. His sincerity and deep interest is of record in a series of addresses delivered soon after returning from Europe, where he had completed his medical studies. In each of them he referred to the necessity of keeping the practice of medicine separated from that of pharmacy, "as different talents were required in their practice." At the conclusion of one of these addresses he said:

"The wisdom of ages, approved by experience, the most certain test of knowledge, has taught us the necessity and utility of appointing different persons for these different employments, and accordingly we find them prosecuted separately."

Last year, at the meeting of Indiana Pharmaceutical Association and dedication of the Pharmacy Building of Purdue University, Dean Charles P. Emerson of Indiana University School of Medicine said in part, in substance: "A doctor cannot serve his patient to the very best of his ability if he is going to dispense; he may, at times, be inclined to prescribe that which he has in stock and that might not be just what his patient needs."

He impressed that symptoms of disease were often struggles of the body to overcome the underlying causes, and the beneficial attempts of the body in this direction should not be hindered; he applied this to indiscriminate selling of medicines for coughs and other stock preparations.

In his opinion, the importance of individual treatment will be better understood; the patient should have the benefit to be derived, and he was hopeful that pharmacists would not permit themselves to be submerged by business to such an extent that they would cease to be students of their profession. Dr. Solomon Solis-Cohen[1] expressed a related thought in a letter to the AMERICAN PHARMACEUTICAL ASSOCIATION, a number of years ago—

"If I may assume to speak for clinical therapeutics to the representatives of Pharmacy, I would say:

Gentlemen, I depend on you in my efforts to help my patient to get well. I depend on your knowledge, your skill, your science, your enterprise, but above all upon your fidelity. I trust you.

You are my armor bearers, as I fight disease. If my spear is dull, my bow-string slack, my arrows unfeathered, my sword rusty, my shield pierced, death awaits them that I would protect. But you give me weapons that I can depend on and I go into battle hopefully with the determination to conquer.

The efforts that you and your co-workers are making to restore pharmacy to the ranks of learned professions and to advance the status of the pharmacist have my earnest sympathy and my sincere coöperation.

[1] Formerly Chairman of the Section on Pharmacology and Therapeutics, *A. M. A.*

Let us stand together, for clean medicine and upright pharmacy; let us oppose quackery, fraud and pretense within as well as without our ranks.

Let the AMERICAN PHARMACEUTICAL ASSOCIATION join the American Medical Association in its determination that the errors of the past be corrected; that the interest of the people, the interests of science shall be our own chief interests and that selfish obstructionists shall be silenced and shamed. Then we can confidently face the future sure of what is better than the mere achievement of success—the deserving of it."

Pharmacists of the past are remembered because of their achievements in pharmacy, aiding the practitioners of medicine by their discoveries and in the development of materia medica, and thereby contributing a public health service. True it is, that the modern laboratories have taken over much of this work and are constantly engaged in research, but nearly all preparations of the retail pharmacy and many prescriptions represent subjects of and for individual study, just as each case coming under the physician's observation presents an individual study.

Dr. Emerson said in an illustrative way in the address to which reference has been made:

"No two persons are just alike. The chances are that the same suit of clothes will fit no two men in this room, and the better your coat fits you the less likely it is to fit any other man. So it is with prescriptions. If I write exactly the same prescription for two cases of pneumonia the chances are that one of them, perhaps neither, will get the best that I can do. In other words, in the future we shall individualize as never before. To give each patient the best chance to win, means we must prescribe very thoroughly and very accurately for him, and this means more assistance from pharmacists."

The most potent measure for bringing about an understanding of the mission of professions is reasonable, rational discussion with the purpose of devising the best means for being of service to the public. This creates public confidence in the individuals, in the practice of medicine and of pharmacy. It benefits the public.

The purpose of Pharmacy Week is not only to acquaint the public with the mission of pharmacy, its pursuit and importance, but a week of self-investigation—as to whether pharmacy is receiving the attention it should have from those who are engaged in its practice.

THE SIGNIFICANCE OF ANNIVERSARIES.

"GIVE me a due and decent esteem of my profession and of myself, that I may regard no man's occupation higher than mine, envying none so long as I serve honorably and well the sick and the injured."—*Paraphrased.*

The celebration of anniversaries recalls the history of the times of their inception, brings us into touch with the active participants in the event or the discovery being memorialized and interprets the facts relating thereto.

The first fifty years following the first recorded use of cinchona gave comparatively little to the world, because the limited knowledge gained was used for exploitation, aggrandizement and monetary returns for those who knew the source of cinchona and how to obtain it. Gradually, however, there came enlightenment and a higher sense of professional obligation. In an article in the *Journal A. M. A.*, on "The Treatment of Malaria," by a well-known authority,

Dr. C. C. Bass, of New Orleans, he makes the statement that "the isolation of quinine from cinchona bark by Pelletier and Caventou, in 1820, marked another advance in the treatment of malaria." The Prix Montyon of 10,000 francs was awarded these pharmacists, and this was the only award they obtained for their cinchona researches, for they took out no patents. It may be of interest to note that this award was the last one made during the lifetime of the French philanthropist, for he died December 1820 (Baron de Montyon—Antoine Jean Baptiste Robert Auget). A purpose of the mention is to impress that both Caventou and Pelletier were pharmacists; too frequently, intentionally or inadvertently, this fact is overlooked.

There are many quinologists whose names deserve mention, of this earlier period and of the present, and they include botanists, pharmacognosists, pharmacologists, chemists, physicians and pharmacists, etc., etc.; however, the purpose of this comment is not to give an historical account, but to mention a few facts of cinchona history, which prompted the celebration of the 300th anniversary. Reference is made to Alfonse Laveran, the French pathologist whose studies contributed largely to rebuilding the health of many people, restoring uninhabitable sections of the world, and making a number of great undertakings possible. The semi-centennial of his discovery of the *Plasmodium malariæ*, known by his name, was most important and greatly simplified the control of malaria, which is now largely a matter of organization and administration.

THE WASHINGTON BICENTENNIAL.

The bicentennnial of Washington's birth brings to mind the publication of the American Military Pharmacopœia and the establishment of the United States Pharmacopœia, and in that connection the pharmacists of a century or two ago are brought into relationship with those of to-day engaged in the revision of the U. S. Pharmacopœia, the National Formulary and the publication of the A. PH. A. Recipe Book, books which have as a purpose service for the public. The two former are important in the conservation of health and life, constant reminders that high educational qualifications and training are essentials for pharmacists in civil life and government activities having to do with medicine, and that pharmacists have responsibilities of service and also duties which include making the public acquainted with pharmacy, its mission and its part in the life of the state and nation. This brings us to the latest important pharmaceutical celebration, that of the sixth observance of Pharmacy Week, relative to which President Hoover has expressed his appreciation in a message printed on page 1161. Prior references were made in the October number, relative to its origin (page 1147).

PHARMACY WEEK.

The worthwhileness of an endeavor is shown in its development, and if the idea is in competition for favor and then grows beyond its competitors; if the idea is put into practice in the country of origin and in other countries; and different nationalities, people of a different tongue and different customs accept it; if laymen speak of it favorably, exhibit an interest; if the purpose is educational and the public gain a better understanding and viewpoint; if citizens in every walk of life become interested in a celebration; if it strengthens those engaged in the

activity in their ideals—then, surely, no further argument is needed to prove the value of the idea.

The foregoing presents the case for an anniversary that has become established. When Chairman Ruth presented the thought, the aims and plan for an annual Pharmacy Week, he rendered an outstanding service in which he is now supported by more than can be estimated. The results of the work speak for the worthwhileness of Pharmacy Week and the active interest of the chairman, members of the committees, the press, associations, organizations, colleges, pharmacists everywhere, and others in the drug industry, none of whom should be omitted in giving credit. It is hoped that mention of the contributary service by E. L. Newcomb and H. V. Arny in preparing the Chemical Map which served as the background for many displays, will be permitted.

Secretary Arthur W. Hyde, of the U. S. Department of Agriculture said:

"Pharmacy Week assures the community of the high professional responsibility behind every pharmaceutical activity and also enlivens the pharmacists' own conceptions of the ethics of their calling."

"Pharmacy Week" rests upon the foundation implied in the foregoing lines.

Anniversaries are reminders of past achievements; they develop studies of progress and energize activities.

CHICAGO WORLD'S FAIR CENTENNIAL CELEBRATION.

THE *Times Magazine*, of October 19th, discussed the architecture and arrangement of the buildings of the Chicago World's Fair of 1933. This Exposition will depict a century of progress, with the contribution of pure and applied science as the main theme.

Prof. E. N. Gathercoal spoke before the National Wholesale Druggists' Association and interested the members in the celebration for which plans are developing, and this brief comment is a preliminary of further discussion of how pharmacy is to be represented at the World's Fair. "Coincident with the exhibit element of the Exposition, the Centennial scene, as contemplated by the Committee, will witness a series of important World Congresses and Conventions, in the deliberations of which the most important personalities in the modern scientific world will participate." In his remarks, Professor Gathercoal stated that "assurance has been given by the officers of the Exposition that pharmacy will receive due recognition and be provided with suitable space without charge for its exhibit, provided that the exhibit is a unified one, is truly scientific and is not in any sense for profit. It is expected, therefore, that there will be no competitive exhibits in connection with pharmacy, but that the exhibit will show the progress made in pharmacy during the past one hundred years."

During the Chicago Fair of 1893, an International Pharmacy Convention was held and the one of 1933 suggests a meeting of the International Pharmaceutical Federation. Pharmacy's participation in the Washington Bicentennial should bring out applicable thoughts for the coming centennial celebration. A Science Advisory Committee of the National Research Council will have charge of the scientific exhibit of the Exposition. "Graphic and dramatic picturization of the advances which have been made in the sciences over a hundred-year period

will make a special appeal to the industries dependent on scientific research for their present existence and their future progress." The Exposition offers an opportunity for pharmacy to make the public better acquainted with its contributions to science, medicine, public health, the industries and commerce. Plans are developing systematically, and with regard to the permanent disposition of the exhibits, "the Science Advisory Committee, which is responsible for bringing together, with the aid of American industry, exhibits in a permanent form, will act as advisers to the Trustees of the Century of Progress in designating appropriate disposal of the exhibits as a whole or in parts to museums or similar bodies constituted by equipment and personnel to display them to the public."

These brief references to the Exposition project will have to suffice for the present, but further comment will, in all probability, find its way into these columns very soon.

FRENCH COLONIAL EXPOSITION.

THE United States has planned for buildings to be erected at the French Colonial Exposition to be held at Paris, France, beginning May 1, 1931. The central structure of the group is to be a reproduction of Mount Vernon. The plans for the buildings have been approved by President Hoover and the American Fine Arts Commission. They have also received approval of the American Ambassador to France, Walter E. Edge, and high officials of the French government, according to the United States Commissioner General to the Exposition, C. Bascom Slemp.

THE LOCAL SECRETARY FOR THE 1931 A. PH. A. MEETING, AT MIAMI.

LOCAL Secretary G. H. Grommet is a graduate of the St. Louis College of Pharmacy, 1909. He is a native of Denver, Colo., and entered the drug business, in 1900, in his home city. Soon after graduating in pharmacy Mr. Grommet engaged with Parke, Davis & Co. in the General Pharmaceutical Department. In 1912, he purchased a retail pharmacy and also became a member of the faculty of the College of Pharmacy of Detroit Institute of Technology.

G. H. GROMMET.
Local Secretary, A. PH. A.

In 1922 the Local Secretary became interested in the advertising business. During the intervening years Mr. Grommet took an active part in association activities and served as president of Michigan Pharmaceutical Association and of Detroit Retail Druggists' Association. His advertising interests brought him to Miami in 1925, at a time when the local druggists were organizing an association of which he was elected *Field Secretary* and organizer of the Greater Miami Pharmaceutical Association, an organization which has continued its activities under the name of Dade County Retail Druggists' Association, and will have a large part in the entertainment of and arrangement for the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION.

Mr. Grommet is again a retail pharmacist, also secretary of Florida Pharmaceutical Association and now *Local Secretary* of the A. PH. A. His successful work has pointed him out as one who can and will direct the convention affairs in a way that will please the Floridians and the visitors.

A Page from Tschirch "Handbook of Pharmacognosy"—"Quinologists of the 19th Century."—The great work of Dr. A. Tschirch (and his co-workers) is being republished in a revised and enlarged edition by Chr. Herm. Tauchnitz, Leipzig. This half-tone was made from a print kindly supplied by Dr. Tschirch, an honorary member of the A. PH. A.; A. Delondre (died 1865) worked on cinchonas with apothecary Bouchardt; Hugh A. Waddell (1819–1877) was an authority on cinchonas; O. Hesse received the Hanbury medal for his work on the chemistry of cinchona alkaloids; John Elliot Howard (died 1883), well known in the development of cinchonas; G. K. W. H. Karsten spent 12 years in South America, he published "The Medicinal Cinchona Barks of New Granada." William Graham MacIvor was superintendent of the cinchona plantations in India, died 1876; Pahud de Mortarge helped to develop the Holland cinchona industry, he was an official of the Netherland's government, died 1873; Otto Berg, Java cinchona student,

died and buried in Java; Philipp Phoebus (1804–1880), his work on the specific rotation of the cinchona alkaloids is noteworthy; A. C. Ouedermans, Franz Wilhelm Junghuhn (1812–1864) and John Eliza de Vrij (1813–1898), known for their cinchona studies in Java, where their bodies rest, a monument has been erected as a memorial; below the latter, in the plate, is shown the monument to Caventou and Pelletier, French pharmacists, the first to isolate quinine.

THE AMERICAN PHARMACEUTICAL ASSOCIATION AND CANADIAN PHARMACEUTICAL ASSOCIATION WILL MEET IN TORONTO, IN 1932.

AT THE Diamond Anniversary meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in St. Louis in 1927, the *Chairman of the Council* of the Canadian Pharmaceutical Association, Dean G. A. Burbidge, and the *Secretary*, Dr. R. B. J. Stanbury, brought greetings from the Canadian Pharmaceutical Association and extended an invitation to the AMERICAN PHARMACEUTICAL ASSOCIATION to hold a joint convention with the Canadian Pharmaceutical Association in Toronto, in 1932, which would be the twenty-fifth anniversary of the founding of the Canadian organization.

This suggestion was received with hearty applause by our American friends and since then the matter has been brought up annually at the conventions of both associations and a definite decision was this year arrived at that both organizations meet together in Toronto, in 1932.

At the Canadian Pharmaceutical Association convention held last August in Halifax, we had the pleasure of a visit from Theodore J. Bradley, former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, and invited him to address a meeting of our Council, when he explained in some detail the operation of the AMERICAN PHARMACEUTICAL ASSOCIATION and the organization work necessary in connection with the convention. General plans were considered and it was tentatively agreed to hold the joint convention the third week in August, which would be the week preceding the Canadian National Exhibition (the greatest annual exhibition in the world), as we feel that many of our friends from the United States would like to remain over a few days to see that great Fair.

On November 3rd, the *Secretary* of the Canadian Pharmaceutical Association had a conference with the *Executive Committee* of the Ontario Retail Druggists' Association and this organization has agreed to defer its annual meeting, which is usually held in June, until the time of our joint convention. As the O. R. D. A. is a large and aggressive organization, its coöperation will add considerably to the attendance and to the enthusiasm of the meeting.

Invitations have been extended by our ASSOCIATION to the Pharmaceutical Society of Great Britain and the various pharmaceutical associations of the overseas dominions, so that we look forward to the meeting in 1932 as marking an epoch in pharmacy on this continent.—R. B. J. Stanbury, *Secretary*, Canadian Pharmaceutical Association.

RETROSPECT OF FIFTY YEARS AGO.*

AN ANTIMONY CUP.

...Very delightful were these literary gatherings (at Jacob Bell's house, shortly after the formation of the Pharmaceutical Society in 1841) which took place in a drawing room, the walls of which were hidden by modern paintings. It was at one of these journal committees that a specimen of the "Pocula Emetica, or Cups of Antimony," was placed on the table....The particular cup in question was exhibited at a conversazione by Mr. Trenham Reeks, of the Museum of Practical Geology, in Jermyn Street, having been purchased for one shilling at a Christie and Manson sale. It was rather a striking object, and the inscription, which was surmounted by a coronet, was in rhymed German. The first word, conspicuously printed in a single undivided line, appeared to be "Dubistein." What could be this string stone or metal? asked (Daniel) Hanbury, always bent on original research. He knew many varieties of stein, but this, he confessed, was new to him. He turned to the dictionary, but was unable to find any mention of the Duby, or Dubi. Finally, the sub-editor took home the goblet, when, not a pharmacist, but a very clever person, resolved the mystery into "Du bist ein stein."

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* Reprinted from *The Chemist and Druggist*, October 15, 1880.

SCIENTIFIC SECTION

PREPARATION OF CARSTANJEN'S COMPOUND.*

BY A. A. HARWOOD.

Any one who has had experience in making this compound may have come to the conclusion that its successful preparation is a matter of chance. Carstanjen himself did not give specific directions therefor. The difficulty may first of all be attributed to a more or less oxidized sulphite. It has also been attributed to an excess of caustic alkali formed in the course of the reaction. This, as already pointed out by Carstanjen, acts on the resulting compound causing it to be oxidized as well as hydrolized.

I. After a number of failures with commercial sulphites, even from sealed bottles, it was decided to prepare the sulphite fresh. One hundred grams of potassium hydroxide were dissolved in 100 cc. of water and the solution was saturated with sulphur dioxide. To the acid sulphite solution thus obtained, an equal amount of KOH was added to convert the acid salt into the normal sulphite. To 20 cc. of this solution, transferred to an Erlenmeyer flask, and heated to 60°, a small amount of thymoquinone was added, the mixture shaken until the thymoquinone had dissolved forming a yellow solution. The reaction mixture was heated to 85° and thymoquinone added in small amounts, shaking the mixture after each addition until an excess had been added as shown by an oily layer on the surface. During the entire process SO_2 gas was passed into the neck of the flask so as to replace the air by this gas. Upon cooling the sulphone crystallized out and was separated by filtration and dried in a vacuum desiccator. It intumesced when heated and gave the red color reaction in alkaline solution as does Carstanjen's compound. When repeated, equally successful results were obtained. In one attempt, however, when too much thymoquinone was added at a time, a dark crystalline mass resulted, presumably thymoquinhydrone. Apparently part of the thymoquinone had been reduced to hydrothymoquinone by the SO_2 before it had time to react with the dissolved sulphite and the reduction product united with unreduced thymoquinone to quinhydrone.

II. As difficulty had been experienced in trying to prevent oxidation during the preparation of Carstanjen's compound by introducing CO_2 to exclude the air or with SO_2 to prevent oxidation, a new means of attack had to be sought. During the hydrolysis of potassium sulphite to the acid sulphite, potassium hydroxide is formed. This reacts with the potassium sulphite thymoquinone compound producing the labile trihydroxy cymene which readily oxidizes to, probably, monohydroxythymoquinone. To prevent the KOH from reacting, an equimolecular amount of potassium acid carbonate was added to the aqueous solution of potassium sulphite. The solution was then heated to 80° C. on the water-bath and thymoquinone added in small amounts. Toward the end of the process, the solution became quite dark and SO_2 gas was passed in when partial decoloration took place. The solution was placed in an ice-bath and allowed to cool whereupon the Carstan-

* Presented to the Scientific Section. Part of a thesis presented as one of the requirements for the doctor's degree, University of Wisconsin.

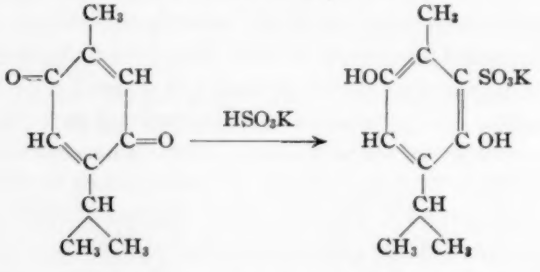
jen compound crystallized out. The SO_2 gas does not seem to reduce any excess thymoquinone as long as an excess of potassium acid carbonate is present.

III. Two attempts were made to prepare Carstanjen's compound with the aid of potassium acid sulphite instead of normal potassium sulphite. As soon as the solution of potassium acid sulphite was heated, an odor of SO_2 was perceptible and, upon addition of thymoquinone, reduction to thymoquinhydrone took place later proceeding to hydrothymoquinone.

The Sodium Analogue of Carstanjen's Compound.—Previous attempts to prepare the sodium analogue to Carstanjen's compound resulted in the formation of tarry masses. Renewed attempts in this direction made with Na_2SO_3 were no more successful. However, when acid sodium sulphite was used, a yellow solution without tar formation resulted. Inasmuch as no crystals separated, even upon cooling, the solution was evaporated and the residue crystallized from hot alcohol. White, needle-shaped crystals were thus obtained which were very soluble in water. With alkali the solution gave a red color. Upon ignition 32 p.c. of ash were obtained whereas $C_{10}H_{13}SO_3Na$ should yield 27 p.c. Na_2SO_4.

Rate of Hydrolysis of M'_2SO_3 Induced by Thymoquinone.—The reactions involved in the formation of Carstanjen's compound have been explained by the following equations and formulas:[1]

$$K_2SO_3 + H_2O \longrightarrow KHSO_3 + KOH \qquad (1)$$



(2)

It has already been pointed out that the KOH not only causes the sulphone to be hydrolyzed but, as Carstanjen states, the alkaline solution absorbs oxygen and the triatomic phenol formed by the hydrolysis is oxidized. Subsequent changes need not here be considered, but it may be well to remind that tarry products have frequently resulted, more particularly when Na_2SO_3 was substituted for K_2SO_3.

Hewitt[2] has tried to determine the amount of KOH set free by the repeated addition of one-tenth moles of thymoquinone. The color interfered with ordinary titration using indicators. It occurred that the problem might be solved by neutralizing the alkali as formed after each addition of thymoquinone. Better still, it might be even more expedient to determine the reduction in acidity of sodium acid sulphite after each addition of thymoquinone. For the sake of comparison, parallel experiments were made with Na_2SO_3 and $NaHSO_3$. One-tenth gram molecule of thymoquinone was used in the first experiment, two-tenth Gm. molecule in the second, etc. The Na_2SO_3 experiments gave the usual tarry mass upon evaporaton

[1] Carstanjen, *J. prakt. Chem.*, 123, page 478. Theoretically the reaction may take place n either positions 2 or 5.

[2] Unpublished part of thesis, U. W.

of the solution, the residues varying in color from brown ($^1/_{10}$ mol.) to almost black (1 mol. of thymoquinone). The color of the residues of the $NaHSO_3$ experiments were much lighter, varying from a light yellow to a brown. However, before evaporation the acidity of the solutions was tested by titration with $N/2$ KOH V.S. using phenolphthalein as indicator. The results are herewith tabulated:

$NaHSO_3$.	Thymoquinone.	Cc. $N/2$ KOH used.	Difference.
10.4 Gm.	Blank	196.9	24.7 cc.
10.4 Gm.	1.6 Gm. 0.1 mole	172.2	23.5 cc.
10.4 Gm.	3.2 Gm. 0.2 mole	149.7	29.5 cc.
10.4 Gm.	4.8 Gm. 0.3 mole	120.2	38.0 cc.
10.4 Gm.	6.4 Gm. 0.4 mole	82.2	18.6 cc.
10.4 Gm.	8.0 Gm. 0.5 mole	63.6	12.3 cc.
10.4 Gm.	9.6 Gm. 0.6 mole	51.3	25.9 cc.
10.4 Gm.	11.2 Gm. 0.7 mole	25.4	3.7 cc.
10.4 Gm.	12.8 Gm. 0.8 mole	21.7	4.6 cc.
10.4 Gm.	14.4 Gm. 0.9 mole	17.1	2.7 cc.
10.4 Gm.	16.8 Gm. 1.0 mole	14.4	

It becomes apparent that with three exceptions the amount of alkali used diminishes with each increase in the thymoquinone added. Ignoring for the moment the three irregularities, one would expect that according to equation No. 1 the amount of KOH set free, *i. e.*, neutralizing the $NaHSO_3$ to Na_2SO_3, would be the same. However, this does not appear to be the case.

THE ULTRAVIOLET TRANSMISSION OF LIQUIDS.*

BY ELLERY H. HARVEY.

INTRODUCTION.

This paper covers the development of a method for the measurement of the ultraviolet transmission (or absorption) of liquids, and records the results obtained on forty typical essential oils, seventeen fatty oils, sixteen representative crude oils and thirty miscellaneous liquids of cognate interest.

Briefly, the technic consists in determining the photochemical decomposition of an oxalic acid solution catalyzed with uranium acetate, by the ultraviolet radiation of a carbon arc, during two hours' exposure through a 3-mm. layer of water, and considering the amount of decomposition as 100%. The identical process is repeated, interposing each time between the source of light and the oxalic acid-uranium acetate solution a 3-mm. layer of the liquid under examination to act as a screen to the passage of the active rays. The more absorbent the liquid toward ultraviolet the less will be the amount of oxalic acid decomposed, hence the number of milligrams of oxalic acid decomposed in each instance when a screening liquid is used, referred to the amount decomposed when a transparent liquid like water is used as 100%, is a direct measure of the transmission (or conversely of the absorption) of the liquid under scrutiny.

HISTORICAL.

The photochemical decomposition of aliphatic acids, particularly when catalyzed, has been known for many years. A brief history of the reaction with

* Scientific Section, A. PH. A., Rapid City meeting, 1929.

which we are especially concerned, *i. e.*, oxalic acid and uranium salts, is given below. Recent interest in the chemical effects produced by ultraviolet radiation has shaped the reaction in the direction of making it a reliable chemical photometer.

The first person to find that uranium salts are sensitive to light was Bucholz[1] who described certain effects produced by the sulphate on alcohol. He also mentions that an ether solution of uranyl nitrate becomes green on exposure to sunlight, precipitating a black substance. Ebelman[2] confirmed the work of Bucholz and extended it by studying uranium oxalate, observing that it decomposed into a brown substance, carbon monoxide and carbon dioxide. Dobereiner[3] proposed to use ferric oxalate as a photometer in which the ferrous oxalate or the carbon dioxide evolved could be measured. St. Victor and Corvissart[4] noticed that if a solution of oxalic acid is exposed to light it will quickly reduce to a gold solution. They heated to boiling a 4% solution of oxalic acid and 1% uranium nitrate, finding it stable in the dark but decomposing at once when exposed to sunlight. Bonaparte[5] obtained a decomposition of valeric acid by catalyzing with uranium salts. Eder[6] used as a photometer a solution of ammonium oxalate and mercuric chloride which on exposure to sunlight gives off carbon dioxide and deposits mercurous chloride according to the reaction:

$$2HgCl_2 + (NH_4)_2C_2O_4 = 2HgCl + 2NH_4Cl + 2CO_2$$

Niepce de St. Victor[7] studied the effect of solar radiation in transforming a number of animal and vegetable materials. He reports in the same article that oxalic acid and uranium salts were heated to 50° C. in the dark for thirty hours without decomposition but that decomposition accompanied by evolution of carbon dioxide began at once when exposed to sunlight. Seekamp[8] repeated the work of St. Victor and Corvissart identifying in the products of decomposition formic acid. Bolton[9] reviewed the previous work and added a number of personal observations. Chastaing[10] studied the effect of red and violet rays on a solution of alcohol and uranium nitrate, getting a strong odor of aldehyde. Wisbar[11] verified the work of Seekamp and showed that butyric acid in the presence of uranium salts and sunlight broke up into propane and carbon dioxide. Fay[12] in his thesis reviews the work done to date and adds new information on the action of sunlight on organic acids in the presence of uranium salts. He mentions that prior to 1896, H. C. Jones at the suggestion of Remsen, verified the work of Seekamp and amplified it.

Bacon[13] reported the photochemical decomposition of aliphatic acids when

[1] *Ann. chim. phys.*, [1], 56 (1806), 142.
[2] *Ann. Chem.* (Liebig), 43 (1831), 294.
[3] *Schweigger's Journ.*, 62 (1831), 90.
[4] *Ann. Chem.* (Liebig), 43 (1842), 114.
[5] *J. prakt. Chem.*, 30 (1843), 308.
[6] *Wein. Acad. Ber.*, 2 (1849), 1879.
[7] *Compt. rend.*, 49 (1859), 368–371.
[8] *Ann. Chem.* (Liebig), 122 (1862), 113.
[9] *Am. J. Sci.*, [2], 48 (1869), 206.
[10] *Ann. chim. phys.*, [5], 11 (1877), 145.
[11] *Ann. Chem.* (Liebig), 232 (1886), 262.
[12] *Amer. Chem. Journ.*, 18 (1896), 269–289.
[13] *Phillipine J. Sci.*, 2 (1907), 129.

catalyzed by uranium salts. Neuberg[1] found later that ferric sulphate could be substituted for the salts of uranium. Bacon[2] utilized the oxalic acid-uranium salt reaction as an ultraviolet radiometer in connection with solar radiation. He found that the action of uranium acetate was quite similar to the nitrate, that the decomposition was proportional to the amount of uranium salt present and that temperature changes exerted very little effect on the amount of oxalic acid decomposed. After studying the reaction Bruner and Kozak[3] found that the decomposition occurred in two steps:

1. $(COOH)_2 = CO_2 + CO + H_2O$. 2. $(COOH)_2 = CO_2 + H.COOH$

The speed of reaction is, contrary to the mass action law, independent of the concentration of the oxalic acid. The authors consider this fact a universal law of photocatalysis, analogous to the Faraday electrochemical law. Berthelot and Gaudechon[4] studied the photolysis of complex acids by ultraviolet rays in the presence of uranium salts and found that the diabasic acids of a normal series split up into a monobasic acid and CO_2. Fluorescent substances inhibited the photolysis. The accelerating action of uranium salts was held to be caused by photochemical resonance. Freer and Gibbs[5] utilized the method of Bacon, after slight modifications, to study the solar radiation of the tropics. Boll[6] found that the reaction was unimolecular when using 0.001 *N* solutions of oxalic acid and uranyl nitrate. Landau[7] compared the photocatalytic activity of uranium salts with other agents. All uranium salts were found to possess marked photocatalytic power. The relative values of this power for six uranium salts and for thorium oxide were compared with the radioactive power as determined by Curie, but no relation was found to exist. The catalytic power of uranium salts is due alone to the cation. Mathews and Dewey[8] made a quantitative study of some photochemical effects produced by the ultraviolet radiation of a quartz mercury vapor lamp, finding that solutions of oxalic acid were decomposed but very slowly; in the presence of uranium acetate, nitrate or sulphate, however, the decomposition was very marked, the rate varying directly with the amount of catalyst present. These authors suggested that the catalysis might be due to the radioactivity of the uranium salts. With the latter view Berthelot and Gaudechon[9] took exception. Henri and Landau[10] applied spectroscopy to the study of chemical equilibrium, using the system oxalic acid-uranyl salts. They found that the quantitative measurement of absorption in the ultraviolet might be used to follow the course of the reaction. The observed exaltation of the absorption constitutes a new proof of the general law that chemical lability causes an exaltation of the absorptive power in the ultraviolet. A direct relation exists between the photo-

[1] *Biochem. Z.*, 29 (1910), 279.
[2] *Phillipine J. Sci.*, 5 (1910), 281.
[3] *Elektrochem. Z.*, 17 (1911), 354.
[4] *Compt. rend.*, 152 (1911), 262.
[5] "8th Inter. Cong. App. Chem.," 20 (1912), 160; *J. Phys. Chem.*, 16 (1912), 709.
[6] *Compt. rend.*, 156 (1913), 1891.
[7] *Ibid.*, 156 (1913), 1894.
[8] *J. Phys. Chem.*, 17 (1913), 216.
[9] *Compt. rend.*, 157 (1913), 333.
[10] *Ibid.*, 158 (1914), 181.

catalytic power and exaltation of absorption for uranyl salts on oxalic acid. Berthelot[1] studied the products of photolysis of oxalic acid by ultraviolet rays of different wave-lengths, finding that the primary decomposition consisted of CO_2 and HCOOH, followed by a secondary decomposition of nascent HCOOH into CO and H_2O by rays of long wave-length, and into CO_2 and H_2 by waves of short length. These facts were held to verify the view that the radiant energy represents a lower form of energy than thermal energy, the frequency of vibration playing the same rôle in the first as does temperature in the second. Benrath[2] found that the greenish yellow powder deposited when uranyl chloride dissolved in ether is exposed to sunlight, to be $UOCl_2$, and a similar precipitate obtained by exposing an aqueous solution of uranyl nitrate containing alcohol to be $UO_2(NO_3)_2$. Baur[3] states that insolated uranyl salt solutions act as if they contained both a higher and a lower state of oxidation in that when reacting with oxalic acid they are able both to oxidize to CO_2 and to reduce to CO; since the uranyl salt solution is fluorescent this indicates a dislocation or loosening of electrons, hence Baur assumes that the action of light is not a complementary oxidation and reduction of different uranyl atoms but is a rearrangement of the electrons within single molecules in such a manner that the molecules become electrically polarized, one terminal of the molecule being positive and the other negative. In the following year Baur[4] advanced the idea that photolysis is analogous to a type of electrolysis. Glycolic acid in the presence of uranyl salts and light is converted into CH_2O and it is experimentally shown that electrolysis gives the same product. Oxalic acid and light with uranyl salts present produce an evolution of CO and CO_2 but it was impossible to find CO in the products of the electrolysis of oxalic acid. Dhar[5] presented evidence to show that reactions which have a large temperature coefficient are sensitive to light, hence sensitiveness to temperature and to light radiations accompany each other. Salts of uranium function as general positive catalysts in photochemical reactions while salts of manganese as general negative catalysts in both the presence and absence of light. Baur and Haggenbacher[6] found formic acid, carbon dioxide and carbon monoxide as the products of the reaction of sunlight on aqueous oxalic acid-uranyl sulphate solutions. Kailan[7] was unable to detect any formic acid as a decomposition product of the irradiation of oxalic acid by a mercury vapor lamp; considerable formic acid developed, however, when uranium salts were added. Kunz-Krause and Manicke[8] observed the lack of information on the subject of decomposition of oxalic acid by artificial light. Using electric arc irradiation on oxalic acid-uranyl acetate solutions they found what others had previously reported. Rideal and Norrish[9] examined various substances for photoactivity by the potentiometer method. $UO_2(NO_3)_2$

[1] *Compt. rend.*, 158 (1914), 1791–1793.
[2] *Z. wiss. Photochem.*, 16 (1917), 253.
[3] *Helvetica Chimica Acta*, 1 (1918), 186.
[4] *Z. Elektrochem.*, 25 (1919), 102–109.
[5] *Proc. Roy. Acad. Sci.* (Amsterdam), 23 (1920), 308.
[6] *Z. physik. Chem.*, 100 (1922), 36.
[7] *Monatsh.*, 43 (1922), 1.
[8] *Ber. deut. pharm. Ges.*, 32 (1922), 209.
[9] *Proc. Roy. Soc.* (London), 103A (1923), 342–366.

was among those tested and it gave definite positive results. Volmar[1] found that hydroxy acids and their salts underwent photolysis when exposed to ultraviolet, the decomposition being accelerated by the presence of such catalysts as uranyl acetate.

Buchi[2] holds that the photochemical decomposition of oxalic acid in the presence of uranium salts is due to the decomposition of non-ionized molecules of uranyl oxalate ($UO_2C_2O_4$), or of complex ions $[UO_2(C_2O_4)_2]$, stressing the great stability of this complex. Holmes[3] suggested the possibility of using the oxalic acid-uranyl salt reaction in connection with the study of the light fastness of colored fabrics. Anderson and Robinson[4] studied the character of the photochemical reaction using a mercury vapor lamp and fused quartz apparatus. It was found that 0.1 *N* oxalic acid solutions through a thickness of 25 mm. absorbed all radiations below 3000 Å. and slightly up to 4050 Å.; oxalic acid solution 0.01 *M* plus uranyl sulphate 0.01 *M* absorbed all radiations below 3600 Å. and partially up to 4100 Å. The authors described a set-up that is satisfactory as an ultraviolet radiometer and showed that under the conditions of their experiment 1 mg. of oxalic acid, decomposed in 30 minutes, correspond to the following number of ergs absorbed at the respective wave-lengths:

Wave-length Å.	Ergs per second.
2550	4.18×10^5
3020	5.04×10^5
3650	5.27×10^5
Complete U. V.	4.84×10^5

Moss and Knapp[5] developed a rather elaborate method for determining the ultraviolet intensity of various light sources, called the "Uroxameter" method, utilizing the oxalic acid-uranium salt photolysis and a specially constructed vessel that rotated on a mechanical stage. They concluded from their determinations that the Uroxameter value was:

1. Only slightly sensitive to temperature, amount of water present and speed of rotation, but that it was affected by,

2. Area of solution irradiated, presence of silica plate, distance from source of light, amount of catalyst present and age of uranium acetate solution.

Eidenow[6] in discussing the various devices used for predicting relative efficiencies of light sources in producing erythema, does not include the oxalic acid-uranium salt reaction.

Sandonnini[7] reported that while powdered carbon is a good absorber of many kinds of radiations it had no catalyzing effect on oxalic acid solutions when the latter were irradiated with an arc lamp.

Wobbe and Noyes[8] used pressure measurements in studying the thermal

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[1] *Compt. rend.*, 176 (1923), 742.
[2] *Z. physik. Chem.*, 111 (1924), 269.
[3] *Am. Dyestuff Reptr.*, 13 (1924), 188.
[4] *J. Am. Chem. Soc.*, 47 (1925), 718.
[5] *J. Soc. Chem. Ind.*, 44 (1925), 453T.
[6] *Lancet*, 209, No. 5320 (1925).
[7] *Atti accad. Lincei*, [6], 2 (1925), 427.
[8] *J. Am. Chem. Soc.*, 48 (1926), 2856.

decomposition of anhydrous oxalic acid and its relation to photochemical decomposition. The latter was produced by using a monochromater and it was found that the effect was negligible for wave-lengths greater than 250 mμ. Since the pressure increase continues after the light is shut off, it is presumed that its mechanism must be sought in physical diffusion through the crystal lattice.

Muller[1] determined the photochemical decomposition of lactic acid and sodium lactate to acetaldehyde, in the presence of uranyl sulphate, from the point of view of its quantum yield. Direct measurement of the radiation, assuming a wave-length of 4025 Å. as the center of the photochemical band, yields 1.05 quanta per mol. which corresponds with 0.99 quanta per mol. as determined from the light energy with the aid of oxalic acid-uranyl sulphate.

Allmand and Reeve[2] followed the photochemical decomposition of aqueous oxalic acid by microanalysis of the gaseous products, the cell having been evacuated previous to exposure to the mercury arc. The quantum efficiency increases with dilution of the solution. The primary reaction is photolysis to CO_2 and formic acid.

Dorcas and Forbes[3] stated that the oxalic acid-uranium salt decomposition, among others, was not satisfactory for studying ultraviolet dosage and recommended the photolysis of *p*-benzoquinone in fifty per cent alcohol.

Gillam and Morton[4] recommend the photolysis of potassium nitrate buffered at p_H 9.4 for a number of purposes but feel it is too slow for general use as an easy routine test for dosage in actino-therapy. These authors continued their study[5] of various methods for determining the ultraviolet intensity of light sources and conclude that the nitrate and carbon tetrachloride methods are most suitable to measure bactericidal rays, while the oxalic acid-uranium salts' decomposition is more suitable for the middle ultraviolet.

Abelous, Aloy and Valdiguie[6] studied the effect of the insolation of the common sugars and found that it produced no appreciable change. Upon addition of a uranium salt, however, the solution changed in color and precipitated in a few minutes. Aldehydes were among the products.

METHOD.

Twenty-five cubic centimeters of a solution containing 6.3 Gm. of oxalic acid $(COOH)_2.2H_2O$, and 4.2 Gm. uranium acetate, $UO_2(C_2H_3O_2)_2.2H_2O$, per liter are exposed to ultraviolet radiation for two hours and the excess oxalic acid titrated with 0.1 *N* potassium permanganate. The reaction vessel is a 100-cc. clear quartz flask having an outside bulb diameter of $2^1/_4$ inches, mounted behind an orifice of the same diameter in a dull black hard rubber box that is otherwise light tight. The flask is eleven inches from the source of light, the filter being mounted just in front of the flask so that no light can enter the flask that is not first passed

[1] *Biochem. Z.*, 178 (1926), 77.
[2] *J. Chem. Soc.*, 45 (1926), 2834.
[3] *J. Am. Chem. Soc.*, 49 (1927), 3081.
[4] *J. Soc. Chem. Ind.*, 46 (1927), 415T.
[5] *Ibid.*, 46 (1927), 417T.
[6] *Compt. rend. soc. biol.*, 96 (1927), 1385.

through the filter. The latter is a clear quartz cell $2^3/_4$ inches in diameter and has a thickness of 3 mm. between the inside walls. It is filled with the liquid under examination for its ultraviolet transmission by using a pipette, filling through a small neck on the top of the cell and permitting the air to escape through a similar opening several millimeters away.

The source of light is an enclosed type carbon arc operating on 220 volt D.C. at 13 amperes. The glass globe surrounding the arc is opaque to wavelengths below 3020 Å. This indicates that none of the very short wavelengths not found in sunlight are present. The electrodes are solid carbons of 12.7-mm. diameter. The total radiation at a distance of 11 inches, center to center, at 13 amperes, was found to be 0.1431 watt per sq. cm., the spectral distribution of the light being shown on the chart.

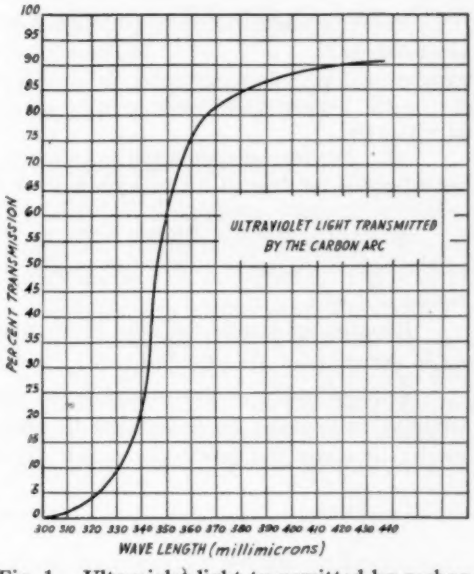

Fig. 1.—Ultraviolet light transmitted by carbon arc.

(To be continued)

A STUDY OF THE TOXIC PROPERTIES OF DIETHYLPHTHALATE.*

BY PHILIP BLICKENSDORFER AND LAWRENCE TEMPLETON.

During the past year there have been outbreaks of a peculiar form of paralysis in certain sections of the United States which have been traced directly to the drinking of a spurious form of Fluidextract of Ginger well known as "Jake" Ginger.

Various theories were at once advanced as to the cause of this paralysis. It has been blamed on diethylphthalate, iso-propyl alcohol, creosote, tri-cresyl phosphate, arsenic, vitamin deficiency and perhaps other causes.

The cause of the paralysis could be blamed on (1) the ginger, (2) the alcohol, and its denaturants or (3) a combination of the two. Diethylphthalate is one of the more common legalized denaturants for industrial alcohol and it seems probable that such a cheap form of alcohol has been used as the menstruum for the spurious "jake."

It is from this reasoning that we have studied the toxic properties of diethylphthalate.

A study of the toxic properties of diethylphthalate has been reported in this journal by Otto M. Smith (JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, Vol. 13 (1924), page 812). In this short paper Smith reports that:

* From the Laboratory of Pharmacology, University of Illinois College of Medicine, Chicago.

(*a*) Per ora doses of $^1/_2\%$ body weight to rats caused considerable pain, sickness and great distress for a period of 10–12 hours. After about 25 hours the behavior of the animal was normal.

(*b*) Leghorn pullets were given $1^1/_2\%$ body weight by mouth with results not so marked as with rats.

(*c*) Persons engaged in the manufacture of the chemical who have their hands and clothing saturated for days at a time have noticed no ill effects.

From his studies, Smith believes that his experiments indicate that diethylphthalate in denatured alcohol is not deleterious to health and is probably nontoxic.

Because of studies of this kind, diethylphthalate has been adopted and used as a denaturant for alcohol.

The following experiments were carried out to determine more in detail its toxicity, especially to determine if when given regularly over a period of time it might produce the paralysis caused by the "jake" ginger.

EXPERIMENTS.

(*a*) Rabbits were given 2 cc. per kilogram body weight by injection into the peritoneum for eight successive days. This would be the equivalent of about 4 oz. per day for a man of medium size (145 lbs.). No abnormal conditions were noticed, except some temporary distress, during and after the period of administration. There was no paralysis or other abnormal after effect.

(*b*) Qualitative tests taken of the urine showed marked amounts of the drug. Quantitatively we found over 50% excreted.

(*c*) Three cc. per kilo was fed to rabbits by stomach tube for eight successive days. Except for temporary distress, the rabbits appeared perfectly normal during the feedings and for the two weeks following the last administration.

(*d*) Guinea-pigs were given 1.5 cc. per kilo by injection into the peritoneum for eight successive days. They showed no permanent ill effects at any time, even after the experiment had been discontinued.

(*e*) During these experiments the drug was also applied to shaved portions of the body of a guinea-pig. The amount absorbed produced no untoward results.

(*f*) One-fourth cc. per kilo of diethylphthalate in physiological salt solution was injected, slowly into the femoral vein of a dog. The respiration was first stimulated and then paralyzed. Samples of urine were taken by catheterizing as soon as injection was begun and the first samples obtained showed traces of diethylphthalate by the recognized qualitative test.

(*g*) Five-tenth cc. was injected intravenously into the ear vein of a rabbit weighing 1800 Gm., and in a few minutes convulsions similar to those produced by strychnine were observed. These symptoms, however, soon disappeared and the rabbit again appeared normal. A slightly larger dose than this is fatal, by paralysis of respiration.

From the various experiments, especially with those on the dog, it appears that the diethylphthalate is excreted very rapidly by the kidneys.

An attempt was made to work out a quantitative test for diethylphthalate so as to measure the amount excreted during a given time as compared to the amount administered. While we have not yet developed a completely satisfactory

quantitative method, we can state definitely that over 50% and perhaps all of the diethylphthalate is excreted by the kidneys.

A fairly accurate quantitative test was perfected for alcoholic solutions but not as yet for urine containing the diethylphthalate.

DISCUSSION AND CONCLUSIONS.

Diethylphthalate may be taken in considerable quantities (over 2 cc. per kilo of body weight per day) without causing any detectable damage. When injected intravenously into animals in doses of 0.25 cc. per kilogram it may cause death by paralysis of the respiratory center. It is rapidly excreted by the kidney. Doses that are insufficient to cause paralysis may cause convulsions due to an action on the central nervous system and which resemble somewhat the convulsions produced by strychnine. It seems probable, therefore, that if the function of the kidneys is below normal, sufficient diethylphthalate could accumulate in the blood to cause damage to the nervous system. In normal health, however, this seems improbable.

THE EFFECT OF BUFFERING THE OUTER PHASE UPON THE STABILITY OF CERTAIN EMULSIONS.*

BY JOHN C. KRANTZ, JR.

INTRODUCTION.

The author with Gordon (1) studied the influence of changes of hydrogen-ion concentration upon the stability of cottonseed oil and mineral oil emulsions, when acacia and tragacanth were used as emulsifying agents. In another communication to THIS JOURNAL, the author (2) observed that acacia and tragacanth exerted a considerable amount of buffer activity upon the unbuffered outer phase of the emulsions. In this investigation, it was observed that with the emulsions in which acacia was the emulsifying agent, those emulsions having an unbuffered outer phase between p_H 2.5 and 10.13 were buffered to approximately p_H 4.3. Likewise those emulsions prepared with tragacanth, with unbuffered outer phases between these points of hydrogen-ion concentration, were buffered to approximately 5.5.

Considering thus the buffer capacities of the emulsifying agents, it becomes quite impossible to ascertain data from stability experiments for these emulsions when the outer phase was between p_H 2.5 and 10.13.

In the previous investigations, using unbuffered solutions as the outer phase of the emulsions, the range of greatest stability with the emulsions prepared with acacia was between p_H 2 and 10.5. Those prepared with tragacanth were most stable between p_H 1.9 and 2.3. In view of the observations made on the buffering action of the emulsifying agent, in the previous experiments, the stability data did not actually include those ranges of hydrogen-ion concentration over which the emulsifying agent exerted its buffer capacity.

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* Scientific Section, A. PH. A., Rapid City meeting, 1929.

In order to ascertain stability data over this range of hydrogen-ion concentration, a series of emulsions was prepared buffering the external phase.

EXPERIMENTAL.

Preparation of Universal Buffer.—In order to make it unnecessary to vary the character of the buffer salts employed securing a large range of hydrogen-ion concentration, the universal buffer mixture of Prideaux and Ward (3) was employed. The buffer for this purpose was prepared by making a 0.2 *N* solution of the following acids, phenyl acetic, boric and phosphoric. The p_H of this primary buffer solution was 1.61. To obtain other values along the p_H scale, various quantities of 0.2 *N* sodium hydroxide solution were added.

Table I records the mixtures of acid and alkali, and the p_H of the resulting solution.

TABLE I.

No.	Primary acid buffer, cc.	0.2 *N* NaOH cc.	p_H.	No.	Primary acid buffer, cc.	0.2 *N* NaOH, cc.	p_H.
1	500	00	1.62	8	300	180	8.72
2	500	50	2.41	9	300	195	9.77
3	500	100	3.38	10	300	210	10.63
4	400	120	4.02	11	300	240	11.52
5	300	120	5.21	12	200	220	11.77
6	300	150	6.60	13	000	250	12.53
7	300	165	7.27			250 cc. H_2O	

Emulsions with Acacia.—Using the buffers described in the foregoing paragraphs as the external phase, two series of emulsions of mineral oil were prepared using acacia as the emulsifying agent. In each instance 40 cc. of a 25 per cent emulsion was prepared using 2.5 Gm. of acacia. The pharmaceutical method of triturating in a mortar was the procedure employed in the preparation.

Considerable change occurred in the p_H of the external phases after these had been used as the solvent for the gum. The results of these changes are recorded in Table II.

TABLE II.

No.	p_H of outer phase.	p_H of emulsion after 3 days.	p_H of emulsion after 10 days.	No.	p_H of outer phase.	p_H of emulsion after 3 days.	p_H of emulsion after 10 days.
1	1.61	2.78	3.00	8	8.72	6.92	6.91
2	2.41	3.30	3.37	9	9.77	7.13	6.99
3	3.38	3.73	3.73	10	10.63	7.75	7.13
4	4.02	4.08	4.16	11	11.52	8.73	8.05
5	5.21	4.93	4.95	12	11.77	11.27	11.24
6	6.60	5.73	5.70	13	12.53	12.10	12.07
7	7.27	5.93	6.02				

After a period of 10 days, equilibrium had undoubtedly established itself and there was no further appreciable change in hydrogen-ion concentration. Although on account of the comparative weak buffer capacity of the buffer solution employed, considerable changes were observed in the hydrogen-ion concentrations of the various emulsions, through these means it was possible to obtain several emulsions with varying points on the p_H scale on both sides of the neutral

point and study their stabilities. The stabilities of these emulsions were studied over a period of a hundred days. The emulsions prepared with 0.1 *N* sodium hydroxide solution p_H 12.53 became quite yellow a few days after preparation, and then separated. The emulsions prepared with the buffer solution p_H 11.77 were quite granular and separated into a inhomogeneous mixture with 4 to 8 days.

All of the other emulsions from p_H 3.00 to p_H 8.05 showed no variation in stability. The outer phases used in the preparation of these emulsions varied from p_H 1.62 to 11.52.

Emulsions with Tragacanth.—Using the foregoing buffer solutions as the external phase, two series of emulsions of mineral oil were prepared using tragacanth as the emulsifying agent. In each instance 40 cc. of a 25 per cent emulsion was prepared using 0.5 Gm. of tragacanth. The pharmaceutical method of triturating in a mortar was the procedure employed in the preparation.

The hydrogen-ion concentrations of these emulsions was determined from time to time after preparation. After twelve days, when equilibrium was established, the following values were observed.

Table III records the changes in p_H which were observed in the outer phase after the preparation of the emulsion.

TABLE III.

No.	p_H of outer phase.	p_H of emulsion after equilibrium.	No.	p_H of outer phase.	p_H of emulsion after equilibrium.
1	1.61	2.09	8	8.72	6.45
2	2.41	2.84	9	9.77	6.89
3	3.38	3.44	10	10.63	6.93
4	4.02	4.05	11	11.52	9.31
5	5.21	5.21	12	11.77	11.63
6	6.60	6.20	13	12.38	12.34
7	7.27	6.33			

These data indicate that considerable change in hydrogen-ion concentration occurred in the outer phase buffer solution after the preparation of the emulsion.

Tables IV and V record the stability of two series of these emulsions over a period of 110 days.

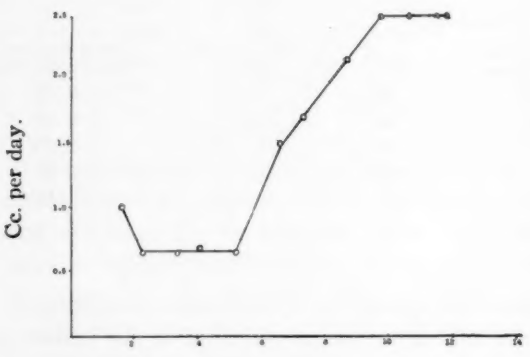
TABLE IV.—MINERAL OIL EMULSIFIED WITH TRAGACANTH.

		Degree of Separation in Cc. in Different Time Periods. Days.								
No.	p_H outer phase.	6	8	14	22	31	49	64	81	110
1	1.61	2	4	8	10	10	12	12	12	12
2	2.41			1	3	5	6	8	8	8
3	3.38			1	2	2	4	5	5	6
4	4.02			1	1	2	4	5	5	6
5	5.21			1	1	2	3	4	5	7
6	6.60					1	2	4	10	17
7	7.27						4	12	18	19
8	8.72				18	23	24	25	25	25
9	9.77				3	23	24	25	26	28
10	10.63					20	22	25	25	25
11	11.52				4	25	27	29	29	29
12	11.77				1	2	3	3	5	8
13	12.38	Slight yellow	Yellow 1 cc.	2	3	4	10	10	16	18

TABLE V.—MINERAL OIL EMULSIFIED WITH TRAGACANTH.

No.	p_H outer phase.	Degree of Separation in Cc. in Different Time Periods. Days. 5	7	15	21	30	48	63	80	111
1	1.61			2	5	5	8	9	9	9
2	2.41			1	1	2	4	5	5	6
3	3.38			1	2	4	5	6	7	7
4	4.02		1	4	6	8	9	10	10	10
5	5.21			3	4	5	7	7	7	7
6	6.60						2	5	10	15
7	7.27				3	7	12	18	18	19
8	8.72				18	20	22	22	25	25
9	9.77					11	26	26	28	28
10	10.63				1	20	26	27	27	28
11	11.52				18	22	26	27	27	28
12	11.77			2	2	2	2	3	5	8
13	12.38		Light yellow	Yellow 2	3	6	14	16	18	18

Omitting the data on emulsion No. 12 which was semi-solid and granular and those on No. 13 which contained no buffer salts in the outer phase, the stability data are plotted in graph No. 1.



p_H Outer phase.

Graph No. 1.

The ordinates of graph No. 1 represent the separation in cc. over a period of 110 days and multiplied by 10 to eliminate decimals.

The observations recorded indicate that the most stable range of hydrogen-ion concentration of these emulsions prepared with tragacanth lies within the p_H range 2.00 to 5.00. These findings with the buffered outer phase emulsions show a larger range of stability than the previous observations made by the author and Gordon (1) when unbuffered solutions were used as the outer phase. In that series of investigations the most stable range of hydrogen-ion concentration of the outer phase with emulsions prepared with tragacanth was p_H 1.9–2.3.

CONCLUSIONS.

(1) The stability of mineral oil emulsions with acacia and tragacanth, using buffered solutions as the outer phase, was studied at various hydrogen-ion concentrations.

(2) With acacia at various points along the hydrogen-ion scale from p_H 2 to 10.5, no variation in stability was observed. As was observed previously those solutions more alkaline than p_H 10.5 produced less stable emulsions.

(3) With tragacanth, the most stable range of hydrogen-ion concentration for emulsions, without a buffered outer phase is in the proximity of p_H 2, with a buffered outer phase, the range extends from p_H 2 to 5.

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(2) J. C. Krantz, Jr., *Ibid.*, 18 (1929), 469.
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THE LEAF OILS OF WASHINGTON CONIFERS: III. PINUS MONTICOLA.

BY ARNOLD J. LEHMAN AND E. V. LYNN.

This tree is commonly called western white pine. It is frequently 100 feet in height, with a straight trunk 4–5 feet in diameter and comparatively slender and spreading branches, which in young trees clothe the stem to the ground, forming a narrow, open pyramid. The symmetry is often broken in later years by the greater development of one or two of the upper branches. The young bark is thin, smooth and light green; on full grown trunks it is thick and has deep, longitudinal and cross fissures. The surface is covered with purplish scales, under which lies the cinnamon-red inner bark. The leaves, borne in clusters of five, are thick, rigid, blue-green and glaucous, 3 to 10 centimeters in length, and serrate, with small, minute teeth. In autumn the young cones are about two centimeters long but, when mature late the next summer, they are 12 to 25 centimeters long, shedding the seeds in early fall. The latter are about 8 millimeters long and colored a pale, red-brown, mottled with black.

Western white pines are scattered in considerable numbers throughout forests of the coast ranges and are not rare in the Cascades, where they occur at elevations of 5000 to 6000 feet. It reaches its noblest dimensions in northern Idaho, where it is found 2000 to 2500 feet above sea-level in river bottoms of streams flowing into Lake Pend Oreille. It is not, however, very abundant in Washington. The material for this work was gathered, partly in the spring and partly in the fall, from trees growing in a sphagnum-covered bog, well saturated with water, within a few miles of Seattle. The stand was quite abundant and consisted almost entirely of young trees, although a few older ones were found along the boundary of the swamp.

The leaves were separated as far as possible from the twigs and immediately distilled with steam. After roughly separating the oil, the aqueous distillate was once cohobated and the cohobated liquid was extracted with ether, which was then added to the oil. After carefully drying the ethereal solution, the solvent was largely removed by distillation, the last portions by means of a vacuum. The amount of oil thus obtained from 750 pounds was 180 cc., equivalent to 0.053 per cent.

The fresh oil had a pleasing, balsamic odor and was colorless, but became lemon-yellow on standing. The general constants were: d_{25° 0.8695; $n_D^{20^\circ}$ 1.4724; $[\alpha]_D^{25^\circ}$ —17.31°; acid number 4.24; saponification value 26.78. Calculating the ester as bornyl acetate, the amount was 7.88 per cent, the quantity of alcohol from this 6.19 per cent.

The oil was first shaken with a 5 per cent solution of sodium carbonate to re-

move the free acids and then with a 5 per cent solution of sodium hydroxide to separate the phenols. The aqueous liquids were then extracted with ether to remove adhering oil, and the ethereal solution was added to the residual oil. The latter mixture was washed with water until the washings were neutral, and the washings were added to the sodium hydroxide liquid. This was then made acid and completely extracted with ether. After drying with calcium chloride, the solvent was evaporated, leaving a small, dark brown liquid with an odor like creosote and methyl salicylate. It was too small in amount for further investigation.

After drying and removing the ether, the remainder of the oil was fractionated under reduced pressure. That portion which boiled below 100° C. at 10 mm. was purified by repeatedly distilling up to the same temperature, the residues in each case being added to the main body of oil. It was then fractionated under ordinary pressure and submitted to several refractionations. The following portions were eventually collected: 157–163° 34.5; 163–169° 31.8; 169–173° 9.0; 173–177° 3.6 per cent of the total oil.

Alpha Pinene.—The first fraction distilled almost entirely between 157° and 159° C.

0.1992 gave 0.4168 CO_2 and 0.1332 H_2O. Found: C, 88.0; H, 11.5. Calculated for $C_{10}H_{16}$: C, 88.2; H, 11.8.

When 5 cc. of the fraction was treated with nitrosyl chloride, the entire liquid became a solid mass of crystals. These were rapidly filtered and washed with alcohol. After recrystallization from chloroform or methyl alcohol, the product had a melting point of 105° C., confirming the presence of alpha pinene.

Camphene.—Since the limits of boiling point of the first fraction might also include camphene, a portion boiling between 161° and 163° C. was hydrated with a sulphuric-acetic mixture. Distillation of the resulting yellow oil gave a strong camphoraceous odor at 200–220°, but the distillate gave no indication of crystallizing. An analysis indicated that about 25 per cent had been hydrated and, although no camphor could be obtained upon oxidation, the formation of isoborneol was strongly evident and camphene is probably present in the original oil.

Beta Pinene.—The second fraction, which was almost as large, distilled mainly between 164° and 166° C.

0.1310 gave 0.4223 CO_2 and 0.1458 H_2O. Found: C, 87.9; H, 12.3. Calculated for $C_{10}H_{16}$: C, 88.2; H, 11.8.

The presence of beta pinene was demonstrated by oxidation with alkaline potassium permanganate. After distillation with steam to remove excess of oil, and filtration from the manganese sludge, the aqueous liquid was evaporated to a small volume in a stream of carbon dioxide. The precipitated sodium salt was acidified and extracted with ether, giving a yellow syrup which gradually crystallized. After purifying, the crystals were found to melt at 126° C. and gave no depression of melting point when mixed with nopinic acid.

Beta Phellandrene.—The third fraction was comparatively small.

0.1377 gave 0.4419 CO_2 and 0.1441 H_2O. Found: C, 87.5; H, 11.6. Calculated: C, 88.2; H, 11.8.

The fraction, dissolved in twice its own volume of petroleum ether, was treated

with nitrous anhydride. The magma which formed was removed by rapid filtration and washed with methyl alcohol. This gave a melting point of 103° C., not depressed by admixture with β-phellandrene nitrite, showing the presence of β-phellandrene in the fraction.

The small fourth fraction gave no crystalline product with bromine, although it might have been expected to contain limonene or dipentene.

Saponification.—Since the terpenes constitute almost 80 per cent, the remainder of the oil was very small in amount. It was hydrolyzed with alcoholic potash, the saponified oil being finally removed with ether and washed until free from alkali. The ether solution was dried and the solvent was removed by distillation. The residual oil was then fractionated, giving a few drops below 208° C., a large share between 208° and 220° and the balance above 260°.

Borneol.—The fraction 208–220° constituted about 6 per cent of the original. It had a strong camphoraceous odor. Oxidation with chromic acid solution produced solid camphor, which collected as a sublimate on the neck of the flask and was found to melt at 175° C. The presence of borneol was further confirmed by the preparation of camphor semicarbazone melting at 236° C.

The acid liquor remaining from oxidation of the borneol was extracted with ether and the ethereal solution was washed and dried. Evaporation of the solvent left a brown, syrupy residue which was not completely soluble in sodium carbonate solution. It was dissolved again in ether and extracted with ether to remove the free acids. The oily residue had a pleasant, aromatic odor and soon deposited feathery crystals. After purification these were found to melt at 110° C. The substance is evidently a lactone, but the amount was too small for analysis.

The oil boiling above 260° C. represented about 6 per cent of the total. It was light blue in color, practically odorless, and insoluble in 70 per cent alcohol.

0.1309 gave 0.4129 CO_2 and 0.1440 H_2O. Found: C, 86.0; H, 12.2. Calculated for $C_{15}H_{24}$: C, 88.2; H, 11.8.

The analysis indicated a large proportion of sesquiterpenes but saturation with dry hydrogen chloride gave no solid product. The blue color indicated some azulene.

The Acids.—The alkaline solution from saponification was evaporated to a small volume, acidified and extracted with ether. The liquid remaining after evaporation of the ether was yellow and had a pronounced odor of butyric acid. The small amount prevented any exact identifications, but butyric acid was strongly suspected because of the odor of the percentage of silver in a prepared salt, 58.5 per cent, and the boiling point. In addition there was also a high boiling acid which gave a silver salt having 65.2 per cent of silver, and which was probably dibasic.

SUMMARY.

Pinus monticola furnishes, by steam distillation of the leaves, 0.053 per cent of oil. The terpenes constitute about 80 per cent, chiefly α-pinene, β-pinene, β-phellandrene and probably camphene. Borneol is the main oxygenated compound, presumably present as butyrate. Azulene is contained in the higher fractions, and an unidentified lactone was found as an oxidation product. There is apparently about 6 per cent of sesquiterpenes.

A STUDY OF TINCTURE OF CAPSICUM.*

BY CHARLES F. POE, ARTHUR P. WYSS AND B. S. SLATOR.

Tincture of Capsicum is an alcoholic preparation of the drug *Capsicum frutescens*, of the Solanaceæ family, and is official in the United States and British pharmacopœias. The British preparation has a strength of only five per cent, while the one listed in the United States Pharmacopœia is ten per cent. The alcoholic strength of the menstruum for the official tincture is of unusual proportions, being nineteen volumes of alcohol to one volume of water, or about ninety per cent alcohol by volume. The reason for this, as stated by the United States Dispensatory (1), is that the oleoresinous constituents of capsicum require alcohol as a solvent, and, on the other hand, a small amount of a constituent soluble in water and insoluble in alcohol, requires a little water so as to prevent cloudiness. A tincture may also be prepared by using a menstruum of a lower percentage of alcohol than that which is called for in the Pharmacopœia, and such a preparation would naturally differ in its constituents from the official product.

The purpose of this investigation was to study the composition of different tinctures of capsicum prepared from unrelated samples of the crude drug, using several percentages of alcohol for the menstrua. In this way it was thought that valuable information might be obtained which would aid in the detection of adulteration, after an analysis for the various constituents had been made.

Tinctures were prepared from eight different samples of capsicum, each of which conformed to the United States Pharmacopœial standards of quality and purity. These tinctures were prepared by the type process of percolation indicated by the tenth revision of the Pharmacopœia with the exception of varying the strengths of alcohol used. The tincture of low percentages of alcohol were cloudy at first, and for this reason they were allowed to stand until the precipitate had settled and then filtered. The samples were then examined by procedures which are essentially those given for food products by the A. O. A. C. Methods of Analysis (2). The determinations made were as follows: Specific gravity, alcohol, total solids, water-soluble solids, alcohol-soluble solids and ether-soluble

TABLE I.—TYPICAL ANALYSIS OF SERIES OF TINCTURES MADE WITH DIFFERENT STRENGTHS OF ALCOHOL.

Per cent of alcohol used (by vol.).	Specific gravity of the tincture.	Per cent of alcohol found in tincture (by vol.).	Total solids per cent in tincture.	Water-Soluble Solids.		Alcohol-Soluble Solids.		Ether-Soluble Solids.	
				Per cent in tincture.	Per cent in solids.	Per cent in tincture.	Per cent in solids.	Per cent in tincture.	Per cent in solids.
00.00	1.01093	00.00	2.49	2.36	94.75	0.577	23.17	0.020	0.803
11.32	0.99719	9.34	2.50	2.34	93.60	0.610	24.40	0.024	0.960
20.38	0.98973	16.21	2.50	2.30	92.00	0.692	27.24	0.018	0.708
29.51	0.98065	25.80	2.43	2.25	92.59	0.720	29.68	0.017	0.700
39.09	0.96759	35.26	2.41	2.16	89.62	0.725	30.08	0.018	0.746
50.04	0.94665	45.65	2.44	2.15	88.11	0.781	32.00	0.090	3.64
60.48	0.92532	53.50	2.85	2.12	74.39	0.982	34.62	0.490	17.19
70.02	0.89921	64.68	2.81	1.90	67.61	1.46	51.94	0.718	25.55
80.17	0.87091	74.60	2.77	1.46	52.70	1.83	66.06	1.090	39.34
91.07	0.83505	84.58	2.55	0.93	36.47	2.18	85.49	1.649	64.66
95.39	0.81778	90.44	2.27	0.46	20.26	2.10	92.51	1.855	81.71

* Scientific Section, A. PH. A., Rapid City meeting, 1929.

solids. The results, obtained for one of the typical series of tinctures analyzed, are recorded in Table I.

The analyses of the different samples gave results which were very similar for the corresponding tinctures made from different samples of capsicum. For the sake of comparison the samples were averaged, and the results are given graphically in Plates I and II. Plate I gives the actual percentages of solids found plotted against the percentages of alcohol used. Plate II shows the percentages of different kinds of solids found in the total-solids.

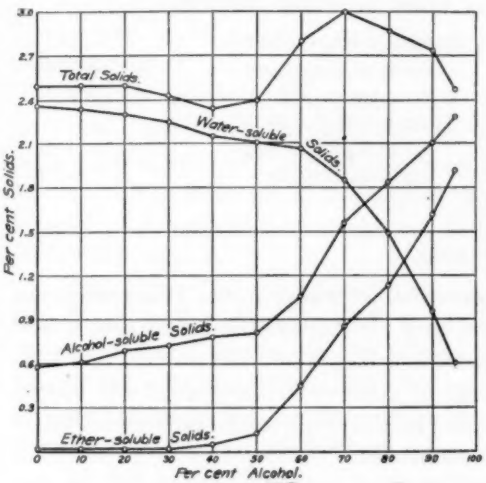

Plate I.

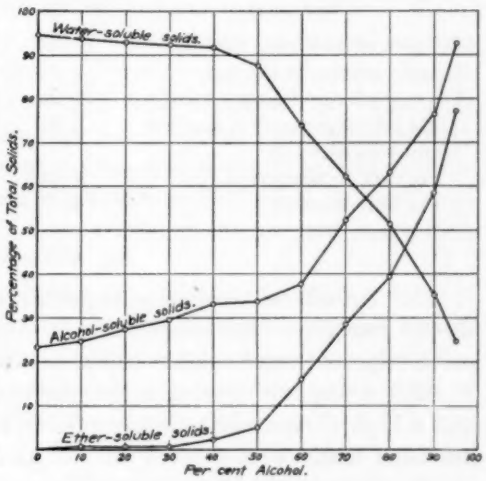

Plate II.

From the results plotted in Plate I it may be seen that the total solids show a slight but gradual reduction until 40% alcohol was used. From this point they increase very rapidly to the point where 70% alcohol was used and then decrease as the alcoholic content increased. The water-soluble solids decrease slightly, in general, up to and including the samples made with 60% alcohol. The decrease from this point up to 95% is very rapid. The difference in the water-soluble solids, for the tinctures made from the 40, 50 and 60% alcoholic menstrua, in all of the samples vary very little. As would be expected the alcohol- and ether-soluble solids increase as the percentage of alcohol in the menstruum increases.

Probably the most important ingredients of tincture of capsicum are those which are soluble in strong alcohol, and consist chiefly of the oleoresins. Tinctures which have a high percentage of total solids are not necessarily of the best quality. Those, however, which have the highest ether- and alcohol-soluble solids should be considered the most valuable.

Plate II presents about the same conclusions as does Plate I. The percentage of water-soluble solids in the total solids shows a decrease as the alcohol in the menstruum increases. The curves for both the alcohol-soluble solids and the ether-soluble solids in the total solids increase as the strength of the menstruum increases. The curve for the latter, however, shows a more marked increase for each ten per cent increase in the alcoholic content of the menstruum, especially between 40 and 95%. For this reason the percentage of the ether-soluble solids in the total solids might afford a slightly better index of quality.

It sometimes happens that tincture of capsicum is prepared from the oleoresin. Several samples of capsicum were mixed and an official oleoresin was prepared. This was used to prepare a tincture of capsicum. The analysis for this tincture is given in Table II. From the table it will be noted that the analysis is somewhat similar to that obtained for the official tinctures. However, the percentage of water-soluble solids in the total solids is much lower, and the percentages of alcohol-soluble solids and ether-soluble solids in the total solids are somewhat higher.

TABLE II.—ANALYSIS OF TINCTURE MADE FROM THE OLEORESIN.

Per cent alcohol used (by vol.)	95.39	Alcohol-soluble solids	
Specific gravity of tincture	0.81689	Per cent in tincture	1.94
Per cent alcohol found (by vol.)	89.20	Per cent in solids	97.77
Total solids, per cent in tincture	1.97	Ether-soluble solids	
Water-soluble solids		Per cent in tincture	1.90
Per cent in tincture	0.095	Per cent in solids	96.66
Per cent in solids	4.78		

CONCLUSIONS.

1. An official tincture of capsicum prepared according to the Pharmacopœia should contain a high percentage of ether- and alcohol-soluble solids and a low percentage of water-soluble solids in the total solids.

2. A tincture having a low percentage of ether- and alcohol-soluble solids, and a high percentage of water-soluble solids in the total solids indicates that it has been made with diluted alcohol as a menstruum.

3. A tincture whose percentage of ether- and alcohol-soluble solids in the total solids are both low as well as the total solids, indicates that it has been made from a drug whose oleoresins have been wholly or partly removed.

4. A tincture with a rather high percentage of ether- and alcohol-soluble solids and a low percentage of water-soluble solids in the total solids, indicates a tincture made from an oleoresin. The percentage total solids will also be somewhat low.

5. If the percentage of total solids is low and the percentages of other solids in the total solids are normal, then the tincture has been prepared by using too little drug, or one adulterated with inert material.

6. In general an official tincture of capsicum will meet the following requirements:

a. Not more than 40% of total solids soluble in water. (Average 34.88%.)
b. Not less than 70% of the total solids soluble in alcohol. (Average 77.04%.)
c. Not less than 50% of the total solids soluble in ether. (Average 58.51%.)
d. The total solids should not be less than 2.5%. (Average 2.75%.)

The above figures are based on a somewhat limited number of samples. Additional analyses should be made to confirm these findings.

REFERENCES.

(1) "United States Dispensatory," 21st Edition, Wood and LaWall.
(2) Methods of Analysis, Assoc. Official Agric. Chemists, 2nd Edition.

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ASSAYS OF SOME OFFICIAL IRON PREPARATIONS CONTAINING ORGANIC MATTER.*

BY W. PAUL BRIGGS.

The purpose of the work described herein was to establish reliable methods for the analysis of several official preparations containing iron. Specifically these are Solution of Iron and Ammonium Acetate, U. S. P. X (1), Solution of Peptonized Iron and Manganese, N. F. V (2), and Solution of Albuminized Iron, N. F. V (2). Of these only Solution of Iron and Ammonium Acetate, U. S. P. X (1), is required to be assayed, and this assay is not satisfactory for several reasons discussed later.

The objections to the U. S. P. X (1) method for the analysis of Solution of Iron and Ammonium Acetate are: *1*, The solution tends to foam when heated, frequently splattering, with a resultant loss of iron, *2*, it is practically impossible to completely burn all of the organic matter present, and *3*, when the residue is treated with hydrochloric acid some of the iron is held in the charred mass, thus giving low results.

The method of the German Pharmacopœia VI (3); of W. Gruning (4); of the *Druggists Circular* (5); of J. L. Mayer (6); boiling with concentrated hydrochloric acid and extracting the ferric chloride with ether; evaporating the solution to dryness in a Kjeldahl flask; evaporating to dryness after the addition of sodium borate were tried, in addition to the one given in the U. S. P. X (1), but were found to be unsatisfactory.

Method of the German Pharmacopœia VI (3).—This method which is essentially that abstracted by the *Druggists Circular* (5) from Riedel's Berichte, for the estimation of Solution of Iron Albuminate, requires the alcohol to be expelled from the solution, solution of hydrogen dioxide added, followed by diluted sulphuric acid, and the mixture heated on a water-bath until the froth produced by the albumin has disappeared. The excess of solution of hydrogen dioxide is then removed by the careful addition of a solution of potassium permanganate. Water is added until the mixture measures 100 cc., filtered and potassium iodide is added to an aliquot part of the filtrate and the liberated iodine is determined with tenth-normal sodium thiosulphate.

This method was tried with each of the three solutions under consideration but proved entirely unsatisfactory for both Solution of Iron and Ammonium Acetate, U. S. P. X (1), and Solution of Peptonized Iron and Manganese, N. F. V (2). Fairly consistent results, however, were obtained for Solution of Albuminized Iron, N. F. V (2) and a detailed method, table of results and criticisms of this method will be found on page 15 of this report.

Method of Gruning (4).—This method, which consists of the iodometric titration of the ash obtained by incinerating the precipitated iron albuminate obtained by adding sodium chloride and acetic acid to the solution, is open to the objection that the ashing is not complete and the subsequent solution of the ash in hydrochloric acid does not contain all of the iron.

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* From the laboratory of A. G. DuMez, Professor of Pharmacy, School of Pharmacy, University of Maryland. Thesis submitted to the Faculty of the Graduate School of the University of Maryland in partial fulfillment of the requirements for the degree of Master of Science.

Mayer's Method (6).—Mayer proposes a method developed especially for the determination of iron in Solution of Iron and Ammonium Acetate, U. S. P. X (1), in which hydrochloric acid and potassium iodide are added to the sample, the mixture kept at 40° C. for half an hour and after cooling titrated with tenth-normal sodium thiosulphate. Repeated experiments with this method showed that while fairly consistent results may be obtained the results are invariably low. It is believed that the glycerin interferes with the reactions since solutions which do not contain glycerine can be accurately determined by this method.

Ether Extraction Method.—Since ferric chloride is soluble in ether and glycerin is insoluble an attempt was made to convert the salt to the chloride by boiling with concentrated hydrochloric acid and then removing the ferric chloride with ether, allowing the ether to evaporate, dissolving the residue in hydrochloric acid and determining the iron in the usual way. The principal difficulty encountered was due to the caramelization of the sugar, which colors the solution brown and renders it extremely difficult to determine when all of the ferric chloride has been extracted.

Evaporation in Kjeldahl Flask.—In evaporating the solutions to dryness in a Kjeldahl flask it was found to be impossible to completely ignite all of the organic matter. By the use of a Kjeldahl flask the loss of iron by splattering is prevented but the addition of hydrochloric acid does not completely remove the iron from the charred mass. Furthermore when the solution contains manganese, as in Solution of Peptonized Iron and Manganese, N. F. V (2), the flask invariably cracks when it is attempted to heat the material to dryness.

Addition of Sodium Borate.—The use of sodium borate to decompose the glycerin proved unsuccessful since on every attempt a hard charred mass remained which could not be completely ignited.

Of all the methods tried, one which was originated by Mayer (6) but not recommended by him proved the most successful. In this method the organic matter is destroyed by heating the material in a Kjeldahl flask with the aid of concentrated sulphuric acid, concentrated nitric acid and solution of hydrogen dioxide added successively, the latter serving also to oxidize the iron and manganese. The iron may then be precipitated as ferric hydroxide and after filtering may be dissolved in hydrochloric acid and estimated in the usual way.

The methods which follow for the assay of Solution of Iron and Ammonium Acetate, U. S. P. X (1), Solution of Peptonized Iron and Manganese, N. F. V (2) and Solution of Albuminized Iron, N. F. V (2) are essentially modifications of the method originally tried by Mayer (6).

EXPERIMENTAL DATA.

1. Solution of Iron and Ammonium Acetate, U. S. P. X (1).

For Solution of Iron and Ammonium Acetate the U. S. P. X (1) states: "Solution of Iron and Ammonium Acetate contains, in each 100 cc., ammonium acetate corresponding to not less than 0.6 Gm. and not more than 0.8 Gm. of NH_3, and not less than 0.16 Gm. and not more than 0.20 Gm. of Fe."

The following method proved satisfactory for this preparation:

Assay for Iron.—Transfer exactly 25 cc. of Solution of Iron and Ammonium Acetate to a 500-cc. Kjeldahl flask and heat gently until the material begins to char, remove the heat, allow

the flask to cool, add 25 cc. of concentrated sulphuric acid and heat strongly for one hour, remove the heat and add 25 cc. of concentrated nitric acid and again heat strongly for about twenty minutes, again remove the heat, add 25 cc. of solution of hydrogen dioxide and again heat strongly until the solution assumes a pale yellow color. Dilute this solution with about 100 cc. of distilled water, and then add ammonia water until the solution is alkaline to litmus, filter, and wash the precipitated ferric hydroxide upon the filter with distilled water, and discard the filtrate and washings. Dissolve the precipitate upon the filter in hydrochloric acid, and then wash the filter, with distilled water, until free from color. Dilute the solution to about 100 cc., add about 2 Gm. of potassium iodide, allow to stand about fifteen minutes, cool, and titrate the liberated iodine with tenth-normal sodium thiosulphate, using starch T.S. as indicator. Each cc. of tenth-normal sodium thiosulphate corresponds to 0.005584 Gm. of Fe.

If the concentrated sulphuric acid is added to the solution before evaporating the foaming is very violent. By evaporating until the mass begins to char and then adding the acid the tendency to foam is practically eliminated. It was found that better results were obtained if the iron was first precipitated from the strong sulphuric acid solution and then dissolved in hydrochloric acid before titrating.

The following equations explain the several reactions occurring in this analysis:

$$Fe_2(SO_4)_3 + 6NH_4(OH) \longrightarrow 2Fe(OH)_3 + 3(NH_4)_2SO_4.$$
$$Fe(OH)_3 + 3HCl \longrightarrow FeCl_3 + 3H_2O.$$
$$2FeCl_3 + 2KI \longrightarrow 2FeCl_2 + 2KCl + I_2.$$
$$I_2 + 2Na_2S_2O_3 \longrightarrow 2NaI + Na_2S_4O_6.$$

Table I shows the results obtained using this method.

TABLE I.—SOLUTION OF IRON AND AMMONIUM ACETATE, U. S. P. X (1).**

Number of sample.	Amount used.	*$N/10$ $Na_2S_2O_3$ consumed.	Gm. of Fe per 100 cc.
1	25 cc.	7.9 cc.	0.172 Gm.
2	25 cc.	7.85 cc.	0.171 Gm.
3	25 cc.	8.0 cc.	0.174 Gm.
4	25 cc.	8.1 cc.	0.176 Gm.
5	25 cc.	7.95 cc.	0.173 Gm.
6	25 cc.	8.15 cc.	0.177 Gm.
7	25 cc.	8.1 cc.	0.176 Gm.
8	25 cc.	8.15 cc.	0.177 Gm.
9	25 cc.	8.1 cc.	0.176 Gm.
10	25 cc.	8.2 cc.	0.178 Gm.

Average: 0.175 Gm. of Fe per 100 cc.
Percentage of error from the theoretical: 1.68%.

** Analysis of the Tincture of Ferric Chloride used in preparing this solution showed an average content of 4.452% Fe, therefore the solution analyzed, upon which Table I is based, should contain 0.178 Gm. of Fe in each 100 cc.

* Exactly 0.0976 *N*.

2. Solution of Peptonized Iron and Manganese, N. F. V (2).

In the absence of assay requirements for Solution of Peptonized Iron and Manganese, N. F. V (2), the following standard, based upon the present requirements for Peptonized Iron, N. F. V (2) and Soluble Manganese Citrate, N. F. V (2) is proposed:

Solution of Peptonized Iron and Manganese contains in each 100 cc. Peptonized Iron, corresponding to not less than 0.266 Gm. and not more than 0.325

Gm. of Fe, and Soluble Manganese Citrate, corresponding to not less than 0.114 Gm. and not more than 0.136 Gm. of Mn.

This proposed standard allows for a 5% variation of iron and manganese using the official chemicals.

This solution exhibits a marked tendency to foam when heated, but this condition can be remedied by evaporating in a Kjeldahl flask. As previously stated solutions which contain manganese, when evaporated to dryness, tend to crack the flasks. This can be avoided by evaporating gently until the material begins to char and then adding sulphuric acid. The acid not only greatly assists in destroying the organic matter but also prevents the flasks from cracking. If the acid be added to the solution before it has been evaporated the tendency to foam is greatly increased. Nitric acid and solution of hydrogen dioxide are also added to hasten the decomposition of the organic matter as well as to oxidize the iron and manganese.

The method of Kolle (7) for the separation of iron and manganese, which depends upon the precipitation of the iron from an acid solution by hexamethylenamine, was tried but was found to be unsatisfactory. The precipitation of the iron as hydroxide is not complete quantitatively and in addition very large quantities of hexamethylenamine are required.

Next it was attempted to precipitate the iron as ferric hydroxide using ammonia water. Ammonium nitrate was added to the solution before the addition of the alkali to prevent the precipitation of the manganese. It is believed that the manganese was not precipitated under these conditions but in every case about one-half of the manganese was held, apparently mechanically, by the ferric hydroxide.

Finally no attempt was made to separate the elements but aliquot parts of the solution containing both iron and manganese were used for the determination of each element. Neither iron nor manganese interferes with the determination of the other element by the process here given.

No effort was made to determine the iron or manganese gravimetrically since volumetric methods, being more rapid, are generally preferred.

The iron content of Solution of Peptonized Iron and Manganese, N. F. V (2) can be determined in exactly the same manner as in Solution of Iron and Ammonium Acetate, U. S. P. X (1).

The most accurate method for the determination of manganese was found to be the so-called bismuthate method (8). This method originally proposed by Schneider (9) in 1888, depends upon the property of bismuth tetroxide in the presence of large quantities of nitric acid, to oxidize manganous salts to permanganic acid. In 1895, Reddrop and Ramage (10) improved the method by substituting for bismuth tetroxide, which frequently contained some chloride, sodium bismuthate. Later, in 1904, Blair (11) found that even traces of hydrochloric acid vitiated the results when using a bismuth compound. The sodium bismuthate of Reddrop and Ramage (10), as well as the article supplied at present is free from even traces of chloride. Lundell (12) reported that the method was accurate to within 1 part in 500 and that the temperature of the solution may vary from 5° C. to 25° C. However, it was found that less opportunity for error is offered if the nitric acid mixture is cooled in an ice bath before adding the sodium bismuthate.

In the method originally proposed by Schneider (9) the permanganic acid was treated with a slight excess of tenth-normal hydrogen dioxide and the excess determined with tenth-normal potassium permanganate. The same technic was employed by Reddrop and Ramage (10). Ibbotson and Brearley (13) in 1901 recommended the use of tenth-normal ferrous sulphate in place of the tenth-normal hydrogen dioxide for the reason that ferrous sulphate does not react with ferric nitrate as does hydrogen dioxide. This modification can be applied to the particular conditions of this assay since the filtrate of sodium permanganate will also contain some ferric nitrate. Blum (14) recommended that the nitric acid concentration of the solution to which the sodium bismuthate was to be added should contain 20% to 40% of nitric acid by volume. He also compared the relative value of tenth-normal ferrous sulphate and tenth-normal ferrous ammonium sulphate and found that the solutions possessed about the same stability and that therefore they could be used indiscriminately.

The following method proved satisfactory for this preparation:

Assay for Iron.—Transfer exactly 25 cc. of Solution of Peptonized Iron and Manganese to a 500-cc. Kjeldahl flask and heat gently until the material begins to char, remove the heat, allow the flask to cool, add 25 cc. of concentrated sulphuric acid, and heat strongly for one hour. Remove the heat and add 25 cc. of concentrated nitric acid and heat strongly for about twenty minutes, again remove the heat, add 25 cc. of solution of hydrogen dioxide and again heat strongly until the solution assumes a pale yellow color. Dilute this solution and transfer to a 250-cc. volumetric flask, carefully washing the first flask with distilled water. If any undissolved material remains, add a slight excess of ammonia water and then nitric acid until the precipitate dissolves, transfer all of this solution to the volumetric flask, and add distilled water until the mixed liquids measure exactly 250 cc. and mix thoroughly. Allow to cool to room temperature, and then transfer exactly 100 cc. of this solution to a 250-cc. beaker, add about 5 Gm. of ammonium nitrate and then ammonia water until the mixture is alkaline. Filter off the ferric hydroxide, wash the precipitate once with distilled water, and discard the filtrate and washings. Dissolve the precipitate in hydrochloric acid, carefully washing the filter with distilled water until free from color. To this solution add about 2 Gm. of potassium iodide, and allow to stand about fifteen minutes, cool and titrate the liberated iodine with tenth-normal sodium thiosulphate, using starch T.S. as indicator. Each cc. of tenth-normal sodium thiosulphate corresponds to 0.005584 Gm. of Fe. This number multiplied by 10 gives the Gm. of Fe in each 100 cc. of solution of peptonized iron and manganese.

Assay for Manganese.—Transfer exactly 100 cc. of the solution contained in the volumetric flask, as prepared for the assay for iron, to a 250-cc. beaker, add 50 cc. of concentrated nitric acid, cool to about 5° C., and add from 0.5 to 1 Gm. of sodium bismuthate, mix thoroughly and allow to stand for one minute. Filter through asbestos, using a Buechner funnel, and wash the residue on the filter with distilled water until the washings are colorless. To this solution add exactly 20 cc. of tenth-normal ferrous sulphate, and titrate the excess of tenth-normal ferrous sulphate with tenth-normal potassium permanganate. Each cc. of tenth-normal ferrous sulphate consumed corresponds to 0.001098 Gm. of Mn. This number multiplied by 10 gives the Gm. of Mn in 100 cc. of solution of peptonized iron and manganese.

The following equations explain the several reactions occurring in this analysis.

$$2Mn(NO_3)_2 + 5NaBiO_3 + 14HNO_3 \longrightarrow 2NaMnO_4 + 5Bi(NO_3)_3 + 3NaNO_3 + 7H_2O.$$

$$2NaMnO_4 + 10xFeSO_4 + 8H_2SO_4 \longrightarrow Na_2SO_4 + 2MnSO_4 + 8H_2O + 5Fe_2(SO_4)_3 + \text{excess } FeSO_4.$$

$$2KMnO_4 + 10FeSO_4 + 8H_2SO_4 \longrightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 5Fe_2(SO_4)_3.$$

Table II shows the results obtained using this method.

TABLE II.—SOLUTION OF PEPTONIZED IRON AND MANGANESE, N. F. V (2).****

Assay for Iron.

Number of sample.	Amount used.	Aliquot equivalent to.	*$N/10$ $Na_2S_2O_3$ consumed.	Gm. of Fe per 100 cc.
1	25 cc.	10 cc.	6.2 cc.	0.337 Gm.
2	25 cc.	10 cc.	6.35 cc.	0.345 Gm.
3	25 cc.	10 cc.	6.1 cc.	0.332 Gm.
4	25 cc.	10 cc.	6.1 cc.	0.332 Gm.
5	25 cc.	10 cc.	6.2 cc.	0.337 Gm.
6	25 cc.	10 cc.	5.9 cc.	0.321 Gm.
7	25 cc.	10 cc.	6.2 cc.	0.337 Gm.
8	25 cc.	10 cc.	6.1 cc.	0.332 Gm.
9	25 cc.	10 cc.	6.2 cc.	0.337 Gm.
10	25 cc.	10 cc.	6.0 cc.	0.326 Gm.

Average: 0.3336 Gm. of Fe per 100 cc.
Percentage of error from the theoretical: 0.80%.

Assay for Manganese.

Number of sample.	Aliquot equivalent to.	**$N/10$ $FeSO_4$ added.	***$N/10$ $KMnO_4$ required.	Gm. of Mn per 100 cc.
1	10 cc.	20 cc.	4.1 cc.	0.152 Gm.
2	10 cc.	20 cc.	4.15 cc.	0.152 Gm.
3	10 cc.	20 cc.	4.1 cc.	0.152 Gm.
4	10 cc.	20 cc.	4.2 cc.	0.151 Gm.
5	10 cc.	20 cc.	3.8 cc.	0.155 Gm.
6	10 cc.	20 cc.	4.2 cc.	0.151 Gm.
7	10 cc.	20 cc.	4.1 cc.	0.152 Gm.
8	10 cc.	20 cc.	4.1 cc.	0.152 Gm.
9	10 cc.	20 cc.	4.0 cc.	0.153 Gm.
10	10 cc.	20 cc.	4.15 cc.	0.151 Gm.

Average: 0.1519 Gm. of Mn per 100 cc.
Percentage of error from the theoretical: 0.39%.

* Exactly 0.0976 *N*.
** Exactly 0.0913 *N*.
*** Exactly 0.1077 *N*.
**** Analysis of the Peptonized Iron and Soluble Manganese Citrate used in preparing this solution showed an average content of 19.22% of Fe, and 17.435% of Mn, respectively; therefore this solution, upon which Table II is based should contain 0.3363 Gm. of Fe and 0.1525 Gm. of Mn per 100 cc.

3. Solution of Albuminized Iron, N. F. V (2).

In the absence of assay requirements for Solution of Albuminized Iron, N. F. V (2), the following standard, based upon the present requirements for Albuminized Iron, N. F. V (2) is proposed:

Solution of Albuminized Iron contains in each 100 cc. Albuminized Iron, corresponding to not less than 0.808 Gm. and not more than 0.997 Gm. of Fe.

This proposed standard allows for a 5% variation of iron using the official chemical.

Efforts to obtain Albuminized Iron, N. F. V (2) disclosed the fact that no manufacturer lists this item. It was possible, however, to obtain a similar product, namely, Iron Albuminated, Merck, containing 5% of Fe_2O_3. This contains approximately one-fifth as much iron as does the N. F. V (2) item. The solution was prepared using Iron Albuminated, Merck, but with the N. F. V (2) quantities.

The finished product differed from the official product only in the quantity of iron present. While this solution was not identical with that of the N. F. V (2) it is believed that, since the difference is only one of quantity of iron, the methods which follow could be used satisfactorily for the Solution of Albuminized Iron, N. F. V (2).

This solution exhibits the tendency to foam noted under the preceding preparations. Treatment similar to that used for Solution of Iron and Ammonium Acetate, U. S. P. X, (1) yielded satisfactory results. It was found that this preparation could also be assayed with a fair degree of accuracy by the method of the German Pharmacopœia VI (3). The latter method while apparently very simple does not yield consistent results unless very carefully controlled, because the excessive foaming frequently causes loss of iron. It will be observed that of the three preparations discussed in this report, Solution of Albuminized Iron, N. F. V (2) is the only one which does not contain glycerin. This probably explains the fact that this solution alone can be successfully assayed by the method of the German Pharmacopœia VI (3) for the determination of iron in Liquor Ferri Albuminati, P. G. VI (3).

The following method proved most satisfactory for this preparation.

Assay for Iron.—Transfer exactly 25 cc. of Solution of Albuminized Iron to a 500-cc. Kjeldahl flask and heat gently until the material begins to char, remove the heat, allow the flask to cool, add 25 cc. of concentrated sulphuric acid and heat strongly for one hour. Remove the heat and add 25 cc. of concentrated nitric acid and heat strongly for about twenty minutes, again remove the heat, and add 25 cc. of solution of hydrogen dioxide and again heat strongly until the solution assumes a yellow color. Dilute this solution with about 100 cc. of distilled water, and then add ammonia water until alkaline, filter, and wash the precipitated ferric hydroxide upon the filter with distilled water, and discard the filtrate and washings. Dissolve the precipitate upon the filter in hydrochloric acid, and then wash the filter with distilled water until free from color. Dilute the solution to about 100 cc., add about 2 Gm. of potassium iodide, allow to stand about fifteen minutes, cool, and titrate the liberated iodine with tenth-normal sodium thiosulphate, using starch T.S. as indicator. Each cc. of tenth-normal sodium thiosulphate corresponds to 0.005584 Gm. of Fe.

Table III shows the results obtained using this method.

TABLE III.—SOLUTION OF ALBUMINIZED IRON, N. F. V (2).*

Number of sample.	Amount used.	**$N/10$ $Na_2S_2O_3$ consumed.	Gm. of Fe per 100 cc.
1	25 cc.	7.9 cc.	0.172 Gm.
2	25 cc.	7.85 cc.	0.171 Gm.
3	25 cc.	7.9 cc.	0.172 Gm.
4	25 cc.	8.0 cc.	0.174 Gm.
5	25 cc.	7.95 cc.	0.173 Gm.

Average: 0.172 Gm. of Fe per 100 cc.

Percentage of error from the theoretical: 1.71%.

* Analysis of the Albuminated Iron used in preparing this solution showed an average content of 3.50% of Fe, therefore the solution analyzed, upon which Table III is based, should contain 0.175 Gm. of Fe in each 100 cc.

** Exactly 0.0976 *N*.

The following method proved fairly satisfactory for this preparation.

Assay for Iron.—Evaporate the alcohol from 20 cc. of Solution of Albuminized Iron and add to the residual liquid while hot 20 cc. of solution of hydrogen dioxide. Shake and allow to

stand until the evolution of gas ceases. Add 30 cc. of diluted sulphuric acid and heat on a water-bath until the froth produced by the albumin has disappeared. Remove the excess of solution of hydrogen dioxide by carefully adding a solution of potassium permanganate (2% to 5%) until a faint but persistant pink color appears. Filter and add about 2 Gm. of potassium iodide to the filtrate, allow to stand about half an hour, and then titrate the liberated iodine with tenth-normal sodium thiosulphate, using starch T.S. as indicator. Each cc. of tenth-normal sodium thiosulphate corresponds to 0.005584 Gm. of Fe.

Table IV shows the results obtained using this method.

TABLE IV.—SOLUTION OF ALBUMINIZED IRON, N. F. V (2).*

Number of sample.	Amount used.	**$N/10$ $Na_2S_2O_3$ consumed.	Gm. of Fe per 100 cc.
1	20 cc.	6.45 cc.	0.175 Gm.
2	20 cc.	6.3 cc.	0.172 Gm.
3	20 cc.	6.35 cc.	0.173 Gm.
4	20 cc.	6.35 cc.	0.173 Gm.
5	20 cc.	5.9 cc.	0.160 Gm.

Average: 0.173 Gm. of Fe per 100 cc. (rejecting No. 5).
Percentage of error from the theoretical: 1.12%.

* Analysis of the Albuminized Iron used in preparing this solution showed an average content of 3.50% of Fe, therefore the solution analyzed, upon which Table IV is based, should contain 0.175 Gm. of Fe in each 100 cc.

** Exactly 0.0976 *N*.

SUMMARY.

Satisfactory methods have been devised for the analysis of Solution of Iron and Ammonium Acetate, U. S. P. X (1), Solution of Peptonized Iron and Manganese, N. F. V (2) and Solution of Albuminized Iron, N. F. V (2).

The method given in the U. S. P. X (1) for the assay for iron in Solution of Iron and Ammonium Acetate, U. S. P. X (1) does not yield true results and should be replaced by a more accurate and dependable method.

Albuminized Iron, N. F. V (2) cannot be obtained at present on the drug market and it seems advisable to change the requirements for this item or to devise a new formula for preparing the Solution of Albuminized Iron, N. F. V (2).

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Perdrigeat, A.
Contribution to the study of cotton seed oil
J. pharm. chim., 12 (1930), 307
Watson, L. K.
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Am. Bee J., 70 (1930), 118; through *J. Soc. Chem. Ind.*, 49 (1930), 917

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Bogert, Marston T., and Hasselström, Torsten
Action of ultraviolet light on terpenes
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Edman, Gösta
Use of saturated potassium hydroxide solution as a micro-reagent for eugenol in drugs
Farm. Revy, 29 (1930), 549
Kaufmann, H. P., and Barich, H.
Bromometric and sulphocyanide determination of essential oils
Arch. Pharm., 267 (1930), 249
Lehman, Arnold J., and Lynn, E. V.
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Bennett, H.
New commercial emulsifying agents
Ind. Eng. Chem., 22 (1930), 1255
Hök, Waldemar
Argentic titrations with indicators adsorbed on silver precipitates
Svensk Farm. Tid., 34 (1930), 121; through *Chem. Abstr.*, 24 (1930), 4899

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Büchi, J.
Polysulphide estimation and preparation of Calcium Sulphide Solution
Pharm. Acta Helv., 5 (1930), 124
Cooper, E. A., and Nichols, S. D.
Bacteriological chemistry of the heavy metals
J. Soc. Chem. Ind., 49 (1930), 386 T
Grippa, A.
Identification of arsenic in pharmaceuticals
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Hincke, W. B.
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J. Am. Chem. Soc., 52 (1930), 3869
Knott, Eric
Coloring effect of iron
Pharm. J., 124 (1930), 98, 108

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Titration of diethylbarbituric acid using phenolphthalein as indicator
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Christensen, E. V.
Investigation of compounds of the somniphen type
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Ekkert, Lad
Contribution to the reactions of thiophene
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Ekkert, Lad
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Pharm. Zentralh., 71 (1930), 626

Hök, Waldemar
Determination of halogen in iodipin
Svensk. Farm. Tid., 34 (1930), 161; through *Chem. Abstr.*, 24 (1930), 4899

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J. Am. Chem., 52 (1930), 4012

Rosenthaler, L.
Behavior of monohydric alcohols toward ferrous sulphate and hydrogen dioxide
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Ruppol, E.
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Schöbel, W.
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Schoetzow, R. E.
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Van Itallie, L., and Steenhauer, A. J.
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Von Bruchausen, F., and Schultze, H.
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Arch. Pharm., 267 (1930), 617

V.d. Berg, L. M.
Preparation of ether for anesthesia from commercial ether
Pharm. Weekbl., 67 (1930), 1029

THE IMPORTANCE OF PHYSIOLOGICAL CHEMISTRY IN MODERN PROFESSIONAL PHARMACY.*

BY LLOYD RIGGS.

Any treatment of the subject that has been assigned to me for discussion to-day obviously requires either that certain definitions be set up or that certain points of view be stated. The chief contact of the author with modern professional pharmacy is at the present time through a college of pharmacy. It may not, therefore, appear to be out of the way to discuss the subject very largely from the point of view of one who is interested in pharmaceutical education. I do, however, wish to insist upon a conception of professional pharmacy which is made sufficiently broad so as to include the practice of pharmacy in the truly great pharmacies of the present day, *i. e.*, in the large pharmaceutical manufacturing establishments, in hospitals, laboratories and pharmacy colleges, as well as in the smaller privately controlled institutions for the practice of the profession.

With regard to the question as to what is bio-chemistry or physiological chemistry, I can do no better than to quote from the statement of Professor Gortner in the May 1930 issue of the *Scientific Monthly* (page 416); "For the present the definition of bio-chemistry may be stated as 'A field of science devoted to the study of the natures and reactions of those compounds found in living matter and the rôle which these compounds play in the living organism,' with the ultimate hope that this definition may be restated as a field of science yielding an interpretation of the reactions of living organisms in terms of physics, chemistry and mathe-

* Section on Education and Legislation, A. PH. A., Baltimore meeting, 1930.

matics." The one point of view upon which I would insist is that physiological chemistry is one of the biological sciences and that physics, chemistry and mathematics are the tools that make its development possible.

The development of physiological chemistry as a science "in its own right" has come about in two different ways. *First*, chemists have become interested in the materials and the phenomena of life and have made outstanding contributions to our understanding of the chemistry of life. In this connection one naturally thinks of the pioneer work of Lavoisier and of Liebig and also recalls the sensation made by the first synthesis of urea by Wöhler. Our present understanding of the chemistry of the carbohydrates, proteins, lipins, excretion products and of intermediary metabolism are the results of work following along this line of effort. *Second*, biologists have turned to physics and chemistry for an explanation of the phenomena which they observe. Claude Bernard, with his mechanistic conception of life, is perhaps the outstanding example of this line of thought which has produced such men as Mathews, Leob and Michaelis and contributed to our knowledge of the importance of hydrogen-ion concentration, the rôle of protein chemistry and of inorganic salts in life phenomena.

Bio-chemistry as a separate science is young. Twenty-five years ago there were but three bio-chemistry departments in American universities. At the present time practically every university has its department of physiological chemistry, named, however, by a variety of names.

Even the most cursory glance at the several departments of physiological chemistry in American universities brings out the fact that there is a wide divergence in their organization, their aims and in the actual subject matter of the courses given and the directions in which their research trends. A rough classification of such departments might be given somewhat as follows:

A. One of the most numerous types of bio-chemistry department is that which exists in so many of our medical schools and which might be very properly called departments of pathological chemistry. Much work of outstanding merit and of value both to medicine and pharmacy comes from such a department.

B. Colleges of Agriculture all have departments which devote their energies to the development and teaching of agricultural bio-chemistry.

C. A certain number of pharmacology departments are very largely given over to a study of bio-chemical problems, and great developments in pharmacy and medicine have come from the work thus organized.

D. Some few departments of bio-chemistry appear to give attention only to that fascinating and dimly seen field where physics, chemistry and mathematics meet in an attempt to solve some of the riddles of life. Theoretical advances in pure physical chemistry come with more or less regularity from such departments.

E. This fifth type of department of physiological chemistry is that of pharmaceutical bio-chemistry and is, so far as I know at the present time and for all practical purposes, non-existent.

What pharmaceutical bio-chemistry is, or should be, is not in my opinion a difficult question to answer. The general statement that such a department should direct its energies toward a study of the bio-chemistry of medicinal agents (pharmaceutical products) about covers the answer to the question. Such a statement, no doubt, calls for some more or less obvious remarks by way of elucida-

tion, but before attempting this, let me say that it appears to me to be obvious that colleges of pharmacy under the rapidly changing conditions of to-day have a responsibility in this matter. The two-year pharmacy course is a thing of the recent past, the three-year course is almost a thing of the past, the four-year course is upon us and the demand for graduate work is felt more keenly almost daily. I, for one, could never develop any enthusiasm for a pharmacy school which had for its only object the training of drug store clerks. If the additional educational requirements of pharmaceutical education mean anything they mean the training of young men and women for leadership in a great and rapidly growing field which is at the present time very largely unoccupied, or at least occupied to a great extent by people who do not have a pharmaceutical background.

The manner in which recent outstanding developments involving pharmaceutical products have come about, well illustrates the point that I have just tried to make. A discovery is made usually in some medical school or institute. This discovery, it appears, may eventually be of utilitarian importance and result in placing on the market a new pharmaceutical product. Such a discovery is announced in the scientific journals and usually the next step is taken by some large manufacturer of pharmaceuticals who coöperates with the discoverer and carries on the investigations essential to the preparation of the material on a commercial scale. Once the new product is on the market the question of assays, standards, etc., is again taken up, but not usually by pharmaceutical institutions. Pharmacy students generally and occasionally, perhaps, faculty members, first learn of such developments after the new product is on the shelves of the local drug store. The examples of insulin, ovarian extracts, the newer antitoxins and synthetic drugs, such as germicidal agents, come promptly to mind. It may not be out of place to ask about the part that colleges of pharmacy have played in such developments. Great pharmaceutical manufacturing establishments are indeed pharmacies and it might be well to ask the question as to whether the men in these great pharmacies who are directly responsible for this work are men trained in colleges of pharmacy. There exists an enormously important field which will be developed, and those of us who are interested in pharmacy colleges are concerned in the question of those who are to be active in such development. Pharmaceutical bio-chemistry is far from being the whole story, but it is perhaps not overstating the case to say that this field is a crucial division of the problem.

Now as to the content of pharmaceutical bio-chemistry. First of all this division of the subject must contain the fundamentals of bio-chemistry which are included in all of the subdivisions of bio-chemistry, such as physics, chemistry, physical chemistry, colloidal chemistry, etc. It must next draw upon pathological chemistry and pharmacological bio-chemistry and be concerned particularly with the chemical aspects of immunology, the vitamins, medicinal agents of biologic origin, and must beyond all maintain itself as a biological science.

If we should grant, for the sake of argument, that a development such as outlined above is desirable, then we must be concerned with the question as to the procedure by which it may be accomplished. I should like to suggest that one of the best methods is to induce young men of ability to think and to see the problems involved and possessing the minimum training of the Ph.D. in bio-chemistry to enter our colleges of pharmacy as members of a faculty or research staff. It is

my opinion that such a man will find problems to challenge his best efforts and will make for himself a place in the world of science; and it is not holding out too great a hope to say he may write a new chapter in the book that will, later on, detail the development of American pharmacy. There is one thing which is of even greater importance than the tentative suggestion of a possible procedure made here, and that is, more harm than good will be done if pharmaceutical bio-chemistry is to be made a step-child in our colleges of pharmacy. It takes time to make a bio-chemist of full professional standing, but bio-chemistry departments in pharmacy colleges should be headed only by such men.

The question may be asked, what can be done about all of this in the four-year course in pharmacy? In reply I would say that the introduction of a certain amount of elective work will come in the four-year course anyway and that the colleges should be in a position to give their best students a chance to specialize along this as well as other lines. But what chance for employment has the student who thus specializes? Large pharmaceutical houses continually need such men. In many of our hospitals the ability to pour medicine out of a bottle qualifies for the practice of pharmacy, and bio-chemistry is presided over by routine technicians in a truly appalling number of cases. Would not many of our hospitals be enormously improved by the establishment of a strong department combining the functions of pharmacy and bio-chemistry? Here is the opportunity for work with a challenge in it and many chances for worth-while investigations. It also seems to me that the private practice of professional pharmacy might well profit by the help of pharmaceutical bio-chemistry. Who to-day thinks of the pharmacist as one who can and will prepare an autogenous vaccine or determine the blood type preparatory to a transfusion? Yet these are labors easily learned and easily carried out.

Of course, such developments in our colleges of pharmacy mean new laboratory facilities and more money, but such things, after all, constitute only one more problem for the deans.

ABSTRACT OF DISCUSSION.

D. B. R. Johnson inquired whether bio-chemistry could be standardized in such a way that there will be agreement. The author replied that there was no agreement; he stated the chief reason for presenting this paper was because of experimenting, in the school with which he was connected, in giving bio-chemistry; at the present time, one year with two lectures a week and laboratory work is given. He said that most of the students and former graduates do not want to drag it out for a year; they want some sort of hurry-up course, where they can learn blood and urine analyses, and a few other things, in a short time. There are a number of technicians in hospitals who have not the faintest idea of what these tests are about, but certainly with one year background as they go through school, they would have the fundamentals of bio-chemistry, which includes the chemistry carbohydrates and other things that pave the way for a sufficient comprehensive study of the pathological side of bio-chemistry. In his opinion colleges of pharmacy should certainly go into this work, and not in a half-hearted way. A four-year course gives adequate time to make a man a practitioner, and this tends to develop a pharmacist's professional standing.

J. H. Webster asked what the prerequisites were. The author replied: "General chemistry, organic chemistry and biology."

Mr. Webster asked further whether the students have a background of organic chemistry; to this the author replied that with the three-year course they had not been able to do this; the work at present is still in the experimental stage.

THE EXTENT AND USE OF FORMER PHARMACOPŒIAL PRODUCTS.*

BY E. FULLERTON COOK AND HARVEY P. FRANK.

Recently there has been some concern expressed over the fact that the Pharmacopœias of the last two decades had omitted about four hundred titles. These omissions were decided on the ground that the products were obsolete or little used or for the reason that, in the opinion of the Committee, there were more efficient remedies of the same class retained in the Pharmacopœia.

As the sole purpose of the Revision Committee has been to improve the value and standing of our Pharmacopœia, the Committee and Board of Trustees approved the plan for a nation-wide study among both physicians and pharmacists, to determine the actual present-day use of these deleted substances.

If there was evidence of the extensive use of these substances, and no other sound reason prevented, they would naturally be returned to the next Edition and the Pharmacopœia made that much more representative of the best and most important in medicine.

Those substances official in the U. S. P. VIII and U. S. P. IX, but not admitted to the U. S. P. X, if therapeutic agents and not merely reagents, were alphabetically listed and these lists were mailed to all physicians and pharmacists whose names could be secured through the help of the secretaries of state medical and pharmaceutical associations and from other available lists. A total of about 9000 questionnaires were mailed to selected names but only about 500 were returned properly filled out.

From the pharmacy group, however, this return represented 237,853 prescriptions from every part of the United States and may be accepted as fairly representative of the situation.

Frequency of Use of Deleted Substances.—In reporting the results it has been difficult to know just how to present the facts graphically and comparatively.

All returned questionnaires were tabulated and the use of each substance in various sections of the United States and also the total use were recorded on ruled sheets and shown at the meeting. The extensive character of these tabulations make their reproduction here prohibitive. A summary of "*total use*," however, is given in the following pages. To show the uses of these deleted substances in comparison with substances at present official, the plan shown in Tables I and II was adopted.

Here the results of the Charters' Report[1] have been taken as the basis of comparison. To establish what might be termed "100 per cent usage" the article reported as being used most frequently was taken as 100 per cent and this is indicated by a line 100 centimeters long in the original chart. The thirty substances reported by Charters to be most frequently used are then listed in the order of their frequency, showing by a line of appropriate length the relative number of times prescribed (see Table I).

The Charters' Report covered the actual analysis of 17,577 prescriptions which were considered to fully represent the 43,000 prescriptions actually collected.

* Report made before Joint Session of the Scientific Section and Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

[1] "Basic Material for a Pharmaceutical Curriculum," by W. W. Charters, page 265.

For comparison, this was calculated to the basis of 237,853 prescriptions, the number analyzed in the current study.

For interesting comparison the results of two other surveys are introduced for the same substances, one made by one of the authors (Cook) in 1928 and covering about 10,000 prescriptions from about 25 cities throughout the United States, and the other the Hallberg-Snow, study made in 1908, and representing 117,000 prescriptions.

The use, as indicated by these later surveys are represented by lines of proportional length. Having thus set up a basis for comparative use the deleted drugs, listed in the questionnaire, are entered in the order of their frequency of use in the 237,853 prescriptions reported upon.

The substance most frequently used is reported first and it will be seen (Table II) that this is 25 per cent of the use accorded Sodium Bicarbonate. Table II shows the actual and comparative number of times each of these fifty titles were prescribed according to the questionnaire study just completed. As figures on the tables as reproduced here are difficult to read, the actual number of times these substances were used in 237,853 prescriptions is repeated in the following list.

THE FIFTY DELETED MEDICINES MOST FREQUENTLY USED.

Elixir of Iron, Quinine and Strychnine Phosphates—3141
Mixture of Rhubarb and Soda—2006
Camphor Monobromated—1842
Strontium Bromide—1594
Cerium Oxalate—1417
Antiseptic Solution—1239
Bismuth Magma—1223
Syrup of Hypophosphites Compound—1078
Acid Nitrohydrochloric Dilute—791
Wine of Colchicum Seed—749
Sodium Perborate—694
Hamamelis Water—658
Ammonium Iodide—605
Syrup of Acacia—602
Dilute Solution of Lead Sub-Acetate—519
Extract of Ergot—514
Morphine (Alkaloid)—506
Wine of Ipecac—506
Fluidextract of Nux Vomica—501
Compound Spirit of Ether—494
Tincture of Gelsemium—465
Extract of Gentian—435
Dilute Hydrocyanic Acid—431
Fluidextract of Wild Cherry—380
Lithium Citrate—364
Fluidextract of Digitalis—361
Tincture of Arnica—348
Fluidextract of Sarsaparilla—311
Calcium Phosphate Precipitated—306
Extract of Opium—281
Compound Powder of Acetanilid—268
Gallic Acid—258
Fluidextract of Grindelia—255
Tincture of Cannabis—252
Bismuth Beta Naphthol—236
Syrup of Blackberry—215
Quinine Salicylate—215
Syrup of Hypophosphites—208
Aromatic Powder—207
Fluidextract of Viburnum Prunifolium—207
Zinc Phenolsulphonate—207
Pill Cathartic, Vegetable—198
Limonis Succus—197
Nitrohydrochloric Acid—192
Tincture of Cimicifuga—188
Fluidextract of Gentian—188
Extract of Digitalis—187
Santonin—183
Fluidextract of Podophyllum—182
Syrup of Calcium Lactophosphates—170

The fifty most frequently used medicines, among those deleted from recent Pharmacopœias, having been listed above, the remaining deleted substances are listed below with an indication of their frequency of use. The number of prescriptions examined is the same in all of the following lists; hence the words "in 237,853 prescriptions," will be omitted, except in the first heading.

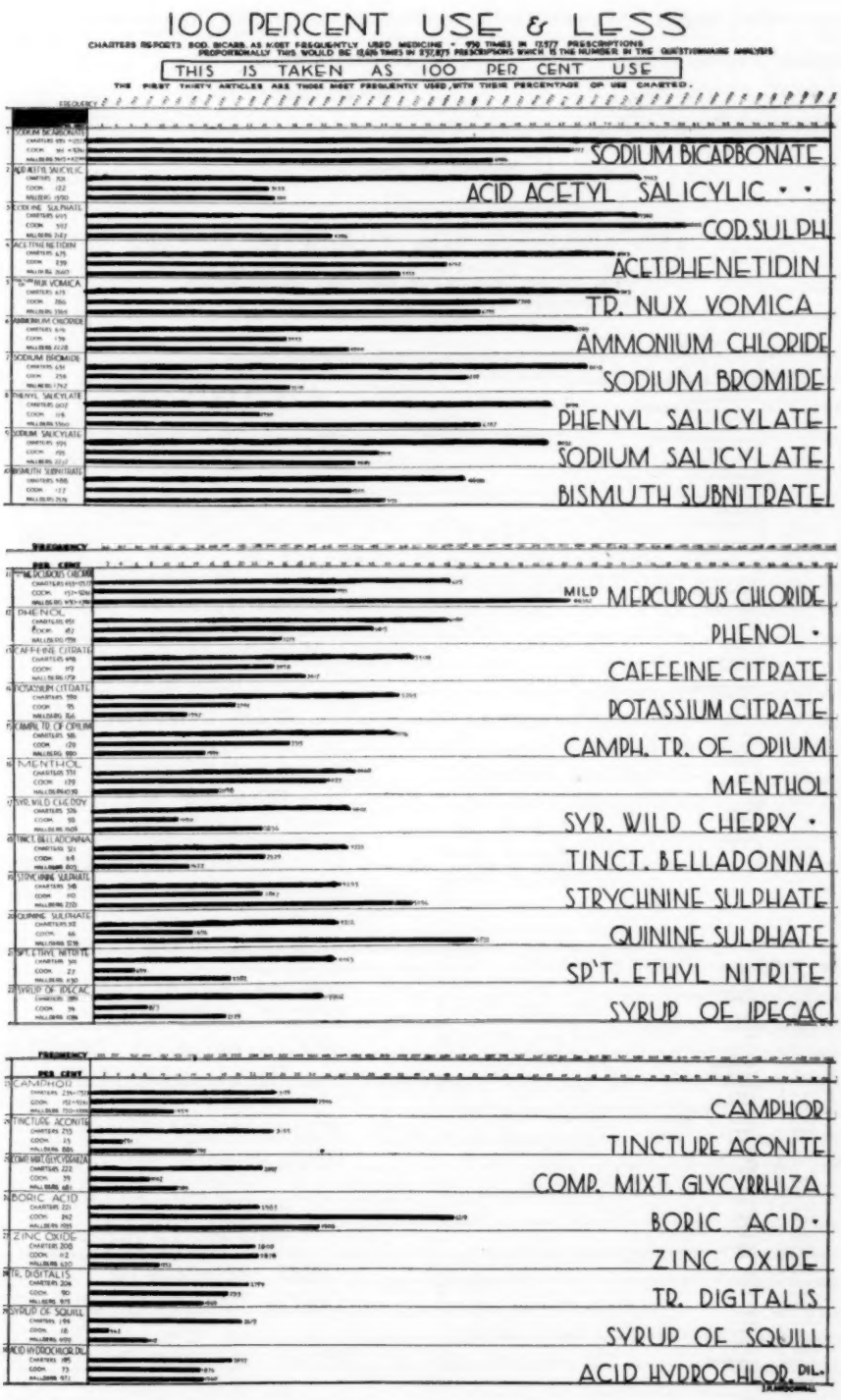


Table I.—The thirty U. S. P. X medicines most frequently prescribed. Graphic illustration of their relative use as reported by Charters, Cook and Hallberg.

FIVE ARTICLES WERE USED 150 TO 175 TIMES IN 237,853 PRESCRIPTIONS.

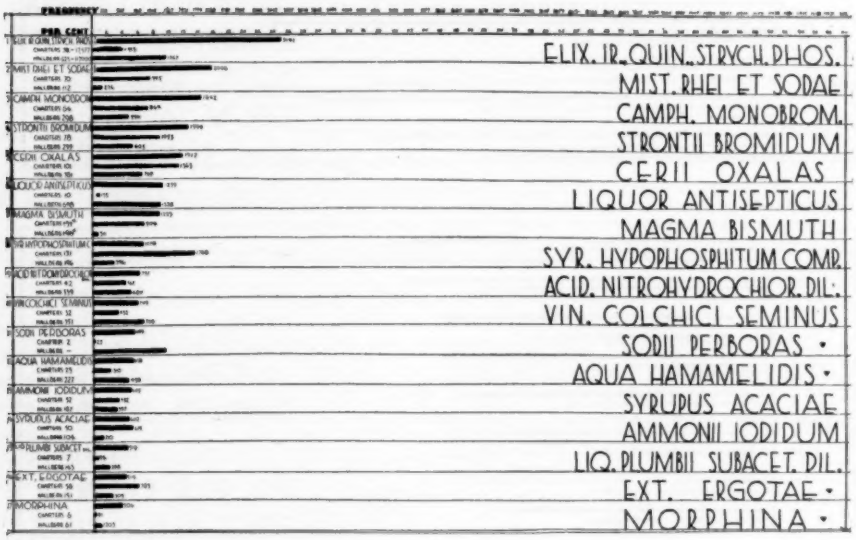
Cinchoninæ Sulphas—164
Fluidextract. Phytolaccæ—155
Sodii Phenolsulphonas—156
Spiritus Aetheris—167
Tinctura Aloes—165

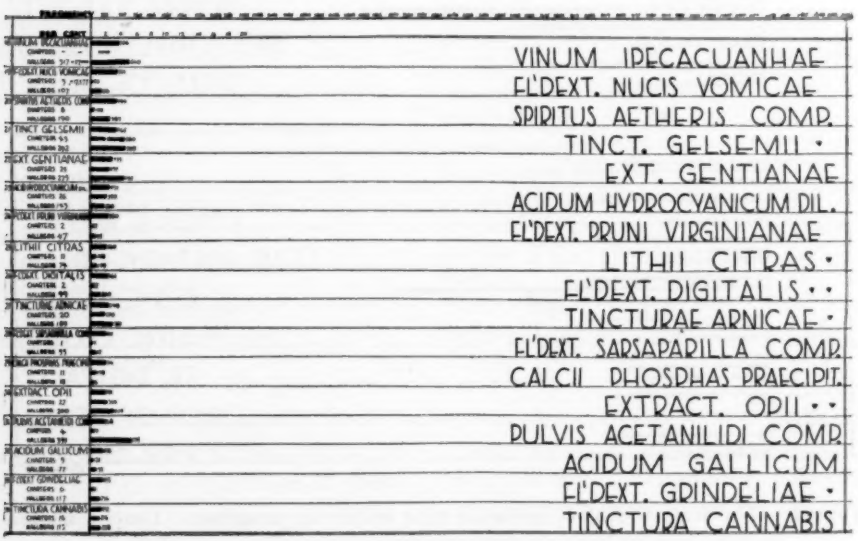
(*Continued on page 1209*)

THE RELATIVE USE of DELETED ARTICLES

STUDY OF THE USE OF 376 ARTICLES OFFICIAL IN THE U.S.P. VIII OR THE U.S.P. IX BUT NOT ADMITTED TO THE U.S.P.X - 237,675 Rx STUDIED

SODIUM BICARBONATE USED AS THE BASIS OF COMPARISON, 100% USE





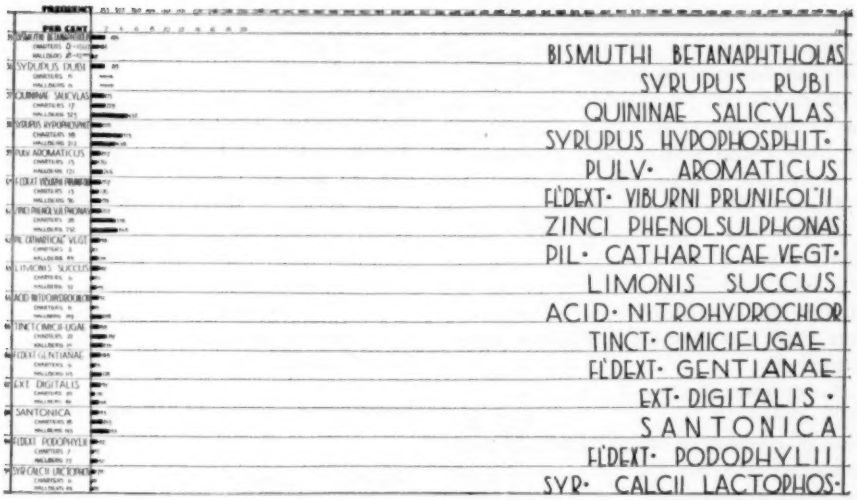


Table II.—Graphic illustration of the most largely used medicines among those deleted from the U. S. P., as compared with the most frequently used U. S. P. X medicines (see Table I).

ELEVEN ARTICLES WERE USED 125 TO 150 TIMES.

Ext. Aconiti—145
Ext. Sumbul—146
Fluidextract. Aconiti—150
Fluidextract. Taraxaci—149
Fluidextract. Tritici—130
Morphinæ Acetas—128
Sparteinæ Sulphas—134
Tinct. Guaiaci Ammoniata—140
Tinct. Hydrastis—129
Ungt. Hydrargyri Nitratis—141

ELEVEN ARTICLES WERE USED 100 TO 125 TIMES.

Acidum Hydrobromicum Dil.—111
Alumini Sulphas—109
Ammonii Valeras—113
Bromoformum—111
Carbo Animalis Purif.—124
Ceratum Resinæ Comp.—108
Ferri et Quininæ Citras—119
Fluidextract Viburni Opuli—111
Ungt. Stramonii—108
Vinum Antimonii—103
Zinci Carbonas Præcipitatus—105

TWENTY-TWO ARTICLES WERE USED 75 TO 100 TIMES.

Diastasum—78
Emulsum Olei Morhuæ Cum Hypophosphitibus—99
Ext. Gelsenii—86
Ext. Hydrastis—80
Fluidextract. Apocyni—82
Fluidextract. Capsici—90
Fluidextract. Cubebæ—90
Fluidextract. Lobeliæ—83
Hydrargyri Oxidum Rubrum—89
Lithii Bromidum—86
Oleum Copaibæ—80
Oleum Cubebæ—95
Oleum Rosæ—95
Physostigminæ Sulphas—95
Sodii Glycerophosphas—99
Sodii Nitras—98
Sodii Sulphis—85
Syrupus Lactucarii—100
Terebinthina—82
Tinct. Guaiaci—78
Tinct. Ipecacuanhæ et Opii—99
Tinct. Sanguinariæ—100

TWENTY-SEVEN ARTICLES WERE USED 50 TO 75 TIMES.

Acidum Camphoricum—62
Arnica—63
Cataplasma Kaolini—60
Ceratum Plumbi Subacetatis—69
Ext. Taraxaci—67
Ferri Pyrophosphas Solubilis—70
Fluidextract. Pilocarpi—56
Fluidextract. Sanguinariæ—56
Glyceritum Hydrastis—58

Hydrastinæ Hydrochloridum—68
Linimentum Belladonnæ—64
Liquor Ferri Subsulphatis—59
Lithii Benzoas—66
Oleum Thymi—73
Pilulæ Rhei Comp.—58
Pulv. Morphinæ Comp.—55
Sodii Arsenas—65
Sodii Chloras—62
Spiritus Juniperi Comp.—64
Strontii Iodidum—54
Strychnina—68
Syrupus Ferri, Quininæ et Strychninæ Phosphatum—63
Tinct. Calendulæ—69
Tinct. Quillajæ—52
Unguentum Hydrargyri Oxidi Rubri—73
Viburnum Prunifolium—64
Vinum Ferri Amarum—57

FORTY-EIGHT ARTICLES WERE USED ONLY 26 TO 50 TIMES.

Alumini Hydroxidum—30
Anisum—28
Aqua Amygdalæ Amaræ—33
Argenti Nitras Mitigatus—44
Auri et Sodii Chlor.—31
Calcii Hypophosphis—40
Calcii Sulphidum Crudum—27
Emplastrum Hydrargyri—49
Ext. Cimicifugæ—27
Ext. Viburni Prunifolii—34
Fluidextract. Aspidospermatis—30
Fluidextract. Aurantii Amari—31
Fluidextract. Berberidis—28
Fluidextract. Cubebæ—44
Fluidextract. Gelsemii—46
Fluidextract. Hamamelidis Foliorum—46
Fluidextract. Krameriæ—37
Fluidextract. Sabal—31
Fluidextract. Stillingiæ—40
Fluidextract. Stramonii—37
Fluidextract. Sumbul—31
Fluidextract. Valerianæ—48
Gossypii Cortex—37
Hydrastina—27
Hyoscyaminæ Sulphas—29
Infusum Pruni Virginianæ—28
Infusum Sennæ Comp.—32
Linimentum Ammoniæ—45
Linimentum Terebinthinæ—41
Lithii Carbonas—41
Magnesii Sulphas Effervescens—27
Oleoresina Cubebæ—37
Oleum Erigerontis—27
Oleum Sabinæ—31
Oleum Sesami—29
Pilulæ Aloes et Mastiches—26
Pilulæ Ferri Iodidi—35
Sodii Hypophosphis—46
Sodii Sulphis Exsiccatus—37
Spiritus Gaultheriæ—34
Syrupus Amygdalæ—34
Tinct. Aloes et Myrrhæ—49
Tinct. Cinnamomi—39
Trochisci Sodii Bicarbonatis—27
Ungt. Potassii Iodidi—36
Ungt. Zinci Stearatis—34
Viburnum Opulus—28
Zinci Iodidum—44

FIFTY-FOUR ARTICLES WERE USED ONLY 10 TO 25 TIMES.

Aethylis Carbamas—13
Amygdala Amara—25
Amygdala Dulcis—15
Aqua Creosoti—15
Aspidosperma—18
Bismuthi et Ammonii Citras—15
Caffeina Citrata Effervescens—24
Calamus—12
Ceratum Camphoræ—18
Chondrus—13
Confectio Sennæ—12
Emulsum Amygdalæ—13
Ext. Euonymi—11
Ferri et Ammonii Tartras—11
Ferri et Potassii Tartras—16
Ferri et Strychninæ Citras—11
Fluidextract. Calumbæ—17
Fluidextract. Convallariæ—17
Fluidextract. Eupatorii—23
Fluidextract. Frangulæ—13
Fluidextract. Mezerei—15
Fluidextract. Rubi—19
Fluidextract. Spigeliæ—12
Fluidextract. Veratri Viridis—18
Grindelia—12
Fluidextract. Xanthoxyli—12
Guaiacum—16
Hamamelidis Folia—12
Hydrastininæ Hydrochloridum—20
Iodolum—19
Liquor Sodii Arsenatis—19
Liquor Sodii Glycerophosphatis—19
Lithii Salicylas—23
Lupulinum—18
Mistura Ferri Composita—18
Naphthalenum—15
Oleoresina Lupulini—19
Oleum Adipis—15
Oleum Pimentæ—16

Pilocarpus—17
Pilulæ Aloes et Myrrhæ—22
Piperina—24
Plumbi Iodidum—18
Sinapis Alba—13
Spiritus Amygdalæ Amaræ—16
Spiritus Juniperi—16
Sumbul—16
Syrupus Krameriæ—13
Tincture Gallæ—16
Tincture Quassiæ—17
Tinctura Serpentariæ—12
Triticum—19
Vinum Ergotæ—11
Vinum Ferri—21
Vinum Opii—16

126 Articles Were Used Only 1 to 10 Times.

Acetum Opii—3
Anthemis—1
Apocynum—5
Argenti Oxidum—10
Berberis—7
Bismuthi Citras—10
Calcii Sulphas Exsiccatus—3
Calendula—3
Cassia Fistula—3
Chirata—1
Chloralformamidum—6
Coca—4
Collodium Cantharidatum—4
Collodium Stypticum—8
Confectio Rosæ—10
Conium—2
Convallaria Radix—2
Coriandrum—1
Cusso or Brayera—9
Cypripedium—1
Emplastrum Resinæ—1
Emplastrum Saponis—9
Emulsum Chloroformi—2
Euonymus—1
Eupatorium—1
Ext. Leptandræ—2
Ext. Physostigmatis—7
Ext. Quassiæ—2
Ferri Hypophosphis—8
Ficus—6
Fluidextract. Aromaticum—6
Fluidextract. Calami—7
Fluidextract. Chimaphilæ—8
Fluidextract. Chiratæ—5
Fluidextract. Cocæ—6
Fluidextract. Conii—5
Fluidextract. Cypripedii—9
Fluidextract. Euonymi—10
Fluidextract. Foeniculi—7
Fluidextract. Geranii—4
Fluidextract. Guaranæ—2
Fluidextract. Lappæ—8
Fluidextract. Leptandræ—7
Fluidextract. Lupulini—9
Fluidextract. Matico—1
Fluidextract. Pareiræ—7
Fluidextract. Quassiæ—8
Fluidextract. Quillajæ—3
Fluidextract. Scutellariæ—2
Fluidextract. Serpentariæ—6
Fluidextract. Staphisagria—2
Frangula—2
Glycyrrhizinum Ammoniatum—8
Guarana—2
Hæmatoxylon—5
Humulus—4
Lactucarium—4
Leptandra—2
Liquor Chlori Comp.—10
Liquor Hydrargyri Nitratis—2
Lithii Citras Effervescens—6
Mangani Hypophosphis—2
Marrubium—1
Masticho—1
Matico—1
Matricaria—3
Moschus—9
Mucilago Sassafras Medullæ—5
Oleatum Atropinæ—1
Oleatrum Cocainæ—2
Oleatrum Quininæ—8
Oleatrum Veratrinæ—1
Oleoresina Petroselini—9
Oleoresina Piperis—7
Oleoresina Zingiberis—1
Oleum Aethereum—1
Oleum Hedeomæ—8
Pareira—1
Petroselinum—5
Phytolacca—7
Pilulæ Aloes et Ferri—4
Pilulæ Laxativæ Comp.—4
Pilulæ Opii—2
Pilulæ Podophylii Belladonnæ et Capsici—5
Pimenta—1
Piper—2
Potassii Cyanidum—7
Potassii Hypophosphis—3
Prunum—3
Quillaja—7
Rubus—8
Sabal—1
Sabina—2
Sanguinaria—7

Sassafras—9
Sassafras Medulla—2
Sodii Arsenas Exsiccatus—2
Sodii Cyanidum—3
Spigelia—6
Staphisagria—3
Stillingia—5
Sulphuris Iodidum—2
Syrupus Calcis—2
Syrupus Rosæ—4
Taraxacum—5
Terebinthina Canadensis—9
Tinctura Lactucarii—9
Tinctura Moschi—1
Tinctura Pyrethri—5
Trituratio Elaterini—4
Trochisci Cubebæ—2
Trochisci Gambir—2
Trochisci Santonini—3
Ungt. Veratrinæ—1
Uranii Nitras—2
Veratrina—1
Vinum Cocæ—7
Xanthoxylum—5
Zinci Bromidum—8
Zinci Valeras

TWENTY-THREE ARTICLES WERE NOT USED AT ALL IN THE 237,853 PRESCRIPTIONS.

Chimaphila
Cinnaldehydum
Emplastrum Opii
Ext. Hæmatoxyli
Ext. Scopolæ
Fluidextract. Quercus
Fluidextract. Sabinæ
Fluidextract. Scopolæ
Gelsemium
Geranium
Hedeoma
Lappa
Mezereum
Mucilago Ulmi
Pyrethrum
Quercus
Salvia
Scopola
Tamarindus
Trochisci Glycyrrhizæ et Opii
Trochisci Krameriæ
Trochisci Potassii Chloratis
Zea

RELATIVE USE BY DOCTORS.

About 3000 questionnaires were sent to physicians and only 222 returned their reports.

The same fifty drugs listed in Table II were reported by physicians as having the following percentage use. This was reported in percentage of those representing *frequent use* and those who *rarely* used the preparations.

Out of the 222 physicians reporting the numbers which follow indicate the actual number who *often* or *rarely* use the substances listed.

	Often. Per cent.	Rare. Per cent.		Often. Per cent.	Rare. Per cent.
Elixir of the Phosphates of Iron, Quinine and Strychnine	38	16	Wine of Ipecac	6	14
Mixture of Rhubarb and Soda	23	24	Fluidextract of Nux Vomica	14	8
Camphor Monobromated	21	26	Compound Spirit of Ether	13	26
Strontium Bromide	15	17	Tincture of Gelsemium	10	17
Cerium Oxalate	19	27	Extract of Gentian	13	9
Antiseptic Solution	22	19	Dilute Hydrocyanic Acid	4	13
Magma Bismuth	10	13	Fluidextract of Wild Cherry	13	12
Syrup of Hypophosphites Compound	14	13	Lithium Citrate	6	5
Acid Nitrohydrochloric Dilute	9	19	Fluidextract of Digitalis	15	9
Wine of Colchicum Seed	5	13	Tincture of Arnica	1	2
Sodium Perborate	14	13	Fluidextract of Sarsaparilla Compound	5	10
Hamamelis Water	14	25	Calcium Phosphate Precipitated	3	8
Ammonium Iodide	10	22	Extract of Opium	11	16
Syrup of Acacia	11	16	Compound Powder of Acetanilid	7	7
Dilute Solution of Lead Subacetate	18	26	Gallic Acid	4	23
Extract of Ergot	19	11	Fluidextract of Grindelia	7	12
Morphine (Alkaloid)	23	9	Tincture of Cannabis	5	16
			Bismuth Beta Naphthol	5	12
			Syrup of Blackberry	4	6

Quinine Salicylate	4	15	Nitrohydrochloric Acid	5	11
Syrup of Hypophosphites	7	12	Tincture of Cimicifuga	4	7
Aromatic Powder	5	12	Fluidextract of Gentian	9	7
Fluidextract of Viburnum Prunifolium	9	16	Extract of Digitalis	10	12
Zinc Phenol Sulphonate	1	3	Santonin	4	8
Pill Cathartic Vegetable	9	10	Fluidextract of Podophyllum	2	8
Limonis Succus	2	9	Syrup of Calcium Lactophosphates	9	9

USE BY HOSPITALS.

Questionnaires were sent to about 75 hospitals and 34 returned their questionnaires. The following list indicates the *percentage* of use of the fifty drugs by hospitals. See Table II.

	Often. Per cent.	Rare. Per cent.		Often. Per cent.	Rare. Per cent.
Elixir of Iron, Quinine and Strychnine Phosphates	62	6	Fluidextract of Digitalis	21	18
Mixture of Rhubarb and Soda	44	32	Tincture of Arnica	12	47
Camphor Monobromated	24	62	Fluidextract of Sarsaparilla Compound	18	32
Strontium Bromide	38	35	Calcium Phosphate Precipitated	21	29
Cerium Oxalate	53	41	Extract of Opium	15	35
Antiseptic Solution	79	6	Compound Powder of Acetanilid	3	26
Magma Bismuth	32	38	Gallic Acid	9	47
Syrup of Hypophosphites Compound	26	32	Fluidextract of Grindelia	12	18
Acid Nitrohydrochloric Dilute	21	32	Tincture of Cannabis	3	44
Wine of Colchicum Seed	18	24	Bismuth Beta Naphthol	3	38
Sodium Perborate	56	18	Syrup of Blackberry	6	9
Hamamelis Water	50	29	Quinine Salicylate	3	35
Ammonium Iodide	12	56	Syrup of Hypophosphites	12	26
Syrup of Acacia	15	21	Aromatic Powder	18	38
Dilute Solution of Lead Subacetate	15	62	Fluidextract of Viburnum Prunifolium	9	35
Extract of Ergot	18	26	Zinc Phenol Sulphonate	12	18
Morphine (Alkaloid)	15	3	Vegetable Cathartic Pill	26	18
Wine of Ipecac	6	44	Lemon Juice	6	12
Fluidextract of Nux Vomica	24	21	Nitrohydrochloric Acid	9	21
Compound Spirit of Ether	24	62	Tincture of Cimicifuga	3	18
Tincture of Gelsemium	6	47	Fluidextract of Gentian	21	21
Extract of Gentian	9	32	Extract of Digitalis	9	29
Dilute Hydrocyanic Acid	15	41	Santonin	6	15
Fluidextract of Wild Cherry	24	15	Fluidextract of Podophyllum	3	21
Lithium Citrate	3	21	Syrup of Calcium Lactophosphates	3	26

SALE BY MANUFACTURERS.

An effort was made to learn how frequently the items on the questionnaire were sold by manufacturing pharmaceutical houses, which were members of the A. D. M. A. The replies were prompt but the majority reported no sales and several only indicated an occasional sale for three or four of the items.

COMPARISON OF USE WITH SIMILAR U. S. P. X PRODUCTS.

To still further determine relative importance, the use of several deleted substances having a therapeutic action similar to a product still official in the U. S. P. were compared with the reported frequency of use of these in the Charters' Report. This study should be elaborated but as an example of the procedure, we give the following:

	Percentage of use in Charters' Report.	Percentage of use as shown by the Questionnaire.
Sodium Bromide	100%—631 times in 17,577 prescriptions or 8518 in 237,853 prescriptions	
Strontium Bromide		1594 times in 237,853 prescriptions or 20% of Sodium Bromide usage
Fluidextract of Ergot	100%—116 times in 17,577 prescriptions or 1566 in 237,853 prescriptions	
Extract of Ergot		514 times in 237,853 prescriptions or 33% of Fluidextract of Ergot usage

ADDITIONS TO THE PHARMACOPŒIA.

A feature of the Questionnaire was the request that those who returned it should suggest such new titles as they believed should find a place in the U. S. P. XI. The following titles have been proposed and are arranged in the order of frequency of suggestion; the one most often mentioned being first.

Ephedrine—32
Ephedrine Solution—26
Ephedrine Hydroch.—12
Ephedrine Salts—11
Ephedrine Sulph.—9
Ephedrine Inhalant—8
Ephedrine Syrup—3
Ephedrine Inhalant Comp.—2
Insulin—23
Mercurochrome—17
Liver Extract—14
Hexylresorcinol—9
Metaphen—9
Irradiated Ergosterol—8
Neo Silvol—6
Elix. Phenobarbital—5
Viosterol—4
Sodium Phenobarbital—4
Syr. Cocillana Comp.—4
Neo Cincophen—4
Diphtheria Toxin-Antitoxin for Test—4
Acriflavine—4
Sulph-Arsphenamine—3
Metrazol—3
Ichthyol—3
Merbaphen—3 (Novasurol)
Pyridium—3
Corpus Luteum—3
Elix. Lactated Pepsin—2
Potassium Sulphocyanate—2
Psyllium Seeds—2
Arsphenamine—2
Calcium Gluconate—2
Sodium Tetraiodo Phenolphthalein—2 (Tetraphthalein Sodium)
Heroin Hydrochlor.—2

The following items were each suggested *once:*

Acriflavine Hydrochlor.
Acriviolet
Adrenal Preparations
Agarol
Allonal
Amytal
Aspidosphermine Crystalline
Aspidosphermine Amorphous
Atophan
Benzyl Benzoate
Bromural
Butyn
Calamine
Calcium Iodide
Carbon Dioxide Gas
Caroid
Cerium Oxalate
Chloretone
Chlorylene
Choline
Citrocarbonate
Collyrium Astringens (German Pharm.)
Dial
Digalin
Elixir Alurate
Emulsion Silver Iodide
Ergotamine
Ethylene for Anaesthesia
Ethylene Tetrachloride
Euresol
Glycerophos. Comp.
Ichthyol

Iron Quinine and Strych. Phos. Elixir	Quinine Di-Hydrobromide
Lotio Alba	Salipyrin
Magnesium Super Oxyl.	Salophen
Manganese Butyrate 20% Sol.	Salysal
Melatone	Sodium Amytal
Milk Powder Dry	Sodium Fluoride
Mixture of Rhubarb and Soda	Sodium Salicylate (True)
Novaspirin	Tannalbin
Orthoform	Theobromine Sodium Acetate
Ovarian preparations	Theophylline Sodium Acetate
Oxytocin	Thyroid preparations
Phenol Tetraiodo Phthalein	Tolysin
Phenyl Azo Diamine	Validol
Potassium Guaiacol Sulphonate	Vasopressin

CONCLUSIONS.

This effort to determine the present-day importance of substances omitted from the Pharmacopœia during the last two decades, has not received the support hoped for but the results are indicative and valuable and should aid the next Subcommittee on Scope in determining omission or deletion in a few of those instances where doubt has been expressed or in any instance in which errors may have been made due to insufficient information.

CHARACTER AND PURPOSE OF THE UNITED STATES PHARMACOPŒIA.*

BY J. H. BEAL.[1]

For more than a century—to be exact, for a hundred and ten years—an enterprise has been carried on in the United States which, measured by its importance to the life and health of the nation should be of great public interest, but which remains practically unknown, even by name, to all but a comparatively small fraction of the population.

This enterprise, known as the United States Pharmacopœia, and the society responsible for its periodical revision and publication, the United States Pharmacopœial Convention, pass their one hundred and tenth anniversary this year, and both are of greater vigor and importance to-day than at any previous time in their history.

Prior to the first U. S. P. there was, in America, no authoritative list of approved medicinal agents, and no generally accepted system of drug nomenclature. Widely different drugs and preparations were often designated by very similar names, while sometimes the same drug was known by several different names, and consequently, there was no assurance that an article supplied on prescription would be the same as that intended by the prescriber, or something of very different composition and potency. To correct this dangerous confusion and to introduce certainty into the compounding and dispensing of medicines the United States Pharmacopœia was instituted.

* An address before the National Association of Retail Druggists, Atlantic City, Sept. 16, 1930.

[1] Chairman U. S. P. Board of Trustees, Camp Walton, Florida.

This epoch-making forward step in American medicine and pharmacy we owe to the initiative of Dr. Lyman Spalding, of New York City, who was chiefly instrumental in calling together the convention of physicians under whose authority the first volume was compiled and published, and who through this service has conferred greater and more lasting benefits upon his fellow Americans than many of the military and political heroes whose exploits are celebrated in every school history.

Our official volume of drug standards, founded one hundred and ten years ago, has the distinction of having had the longest continuous existence of any national pharmacopœia in the world, save one,[1] and its official sponsor, the United States Pharmacopœial Convention, likewise has the distinction of being one of the oldest of existing professional organizations.

PHARMACOPŒIA MUST POSSESS OFFICIAL CHARACTER.

The primary purpose of a pharmacopœia is to supply an authoritative list of drugs and preparations of established therapeutic value, accurately standardized as to composition, purity and strength, and provided with specific titles which shall have the same meaning to all physicians and pharmacists wherever located.

But not every work presenting a list of standardized drugs is entitled to be called a pharmacopœia. It must also possess a certain public or "official" character, either through its compilation under direct governmental authority or, as in the United States, by virtue of its compilation under the combined direction of the medical and pharmaceutical professions and its subsequent recognition by Federal and State legislative action.

INTRODUCTION OF PHARMACISTS INTO THE WORK OF PHARMACOPŒIAL REVISION.

Revision of the Pharmacopœia was at first exclusively in the hands of the medical profession, but it early became evident that drug standards could best be established by those trained in the handling of drugs, and the assistance of pharmacists was solicited. Valuable improvements proposed by the New York, Boston and Philadelphia Colleges of Pharmacy were incorporated in the 1840 Revision (published in 1842), but it was not until 1850 that delegates from Colleges of Pharmacy were formally admitted to the Pharmacopœial Convention.

Up to this time the work of revision had been more or less a library process, consisting mainly in the consideration of written propositions for the admission of new or the deletion of old drugs or formulas. Of scientific investigation in the modern sense, or of planned research under the direct supervision of the Revision Committee there was practically none.

In the Seventies and Eighties of the last century, a new factor was introduced into the equation, which had the effect of materially influencing the attitude of the medical profession toward the Pharmacopœia.

It was this period which saw the beginning of the wonderful development in manufacturing pharmacy which has culminated in the great pharmaceutical laboratories of the present day. From the first these organizations were indefatigable in the introduction and exploitation of new remedies, in the improvement of pharmaceutical processes and formulas, and in the devising of elegant and

[1] The first French Codex was issued in 1818.

palatable substitutes for the frequently less attractive official preparations, all of which were brought to the attention of the medical profession by clever and insistent propaganda.

With such a wealth of new medicinal agents, and of improved forms of the older ones constantly thrust upon their attention, it was quite natural that physicians should less acutely feel the need of the Pharmacopœia as an aid to prescribing, and that their interest in the periodical revision of that volume should correspondingly decrease. It is not surprising, therefore, that for a time the question of either discontinuing the Pharmacopœia, or of turning its revision and publication entirely over to private enterprise was seriously discussed.

Fortunately as medical interest in revision work declined, pharmaceutical interest increased. From the date of its organization in 1851 the AMERICAN PHARMACEUTICAL ASSOCIATION was a strong supporter of the U. S. P., and its annual programs abounded in papers relating to pharmacopœial processes and products. Fortunately, also, at this critical period there was among the members of the A. PH. A. that master mind of pharmacy, Dr. Charles Rice, the scholarly chemist-apothecary of Bellevue Hospital, who was intensely interested in everything pertaining to the Pharmacopœia, and in whom was combined immense learning with complete devotion to science, while his linguistic ability was such that he could read the literature of pharmacy in any European language.

With Dr. Rice's chairmanship of the Revision Committee in 1880 began the period of revision based upon critical investigation and planned research, involving the experimental comparison of formulas, the development of reliable tests of identity and purity, the devising of practical methods of assay, the adoption of the purity rubric and of more concise and accurate definitions and descriptions for official drugs and products.

To Charles Rice, therefore, belongs the credit of initiating the modern method of pharmacopœial revision which, as expanded by his capable successors, and with the aid of the greater financial resources at their disposal, has given us a volume of drug standards that has been termed "the aristocrat among pharmacopœias," and which commands the profound respect of pharmacopœia-makers throughout the world.

DEMOCRATIC CHARACTER OF UNITED STATES PHARMACOPŒIA.

Ours is the most democratic of all pharmacopœias in the derivation of its authority. While other national pharmacopœias are revised by commissions appointed by their respective governments and are, therefore, in the nature of government bulletins, the U. S. P. Committee of Revision receives its authority directly from the professions of medicine and pharmacy as represented in the *United States Pharmacopœial Convention*, a body incorporated under the laws of the United States, and meeting at Washington every tenth year. This Convention is composed of delegates from all recognized teaching institutions of medicine and pharmacy, from all incorporated state medical and pharmaceutical societies, and from ten or more national associations representing medicine, pharmacy, dentistry and chemistry, or whose members are connected with the enforcement of Federal and State Food and Drug Laws, together with certain delegates directly representing various departments of the United States Government.[1]

[1] Foot-note—see page 1218.

While there may be additional societies and institutions which might appropriately be admitted to membership it would be difficult to conceive of an assembly more thoroughly representative of the professions of medicine and pharmacy, and of their related arts and sciences, than the U. S. P. Convention: and there is probably no other society meeting in the United States which brings together at one time and place so large a number of acknowledged experts in the arts and sciences represented.

The United States Pharmacopœial Convention has supreme power over the Pharmacopœia, including the sole right to amend its Constitution and By-Laws, to prescribe the methods of revision, and to elect and direct those who are responsible for what goes into or is kept out of that volume.

At its decennial meetings the Convention prepares and adopts a platform of "General Principles" to be observed in revising the Pharmacopœia, and elects a General Committee of Revision and a Board of Trustees which are to carry these principles into effect.

THE BOARD OF TRUSTEES AND FINANCIAL AFFAIRS OF THE CONVENTION.

The scientific work on the Pharmacopœia is under the direction of the General Committee of Revision, but all the business and financial affairs of the Convention, including the employment of experts, the authorization of expenditures for supplies, material and clerical expenses, for abstracting of literature, contracts for the publication and sale of the Pharmacopœia, etc., etc., are in the hands of the Board of Trustees.

The income of the Convention is derived solely from the sales of the Pharmacopœia and from copyright charges for use of the text in other publications, and is devoted exclusively to the payment of the expenses of revision and publication of the Pharmacopœia.

Only one person connected with revision work, the Chairman of the Executive Committee, receives a salary, but after the revision is completed the Board of

[1] NOTE: The exact membership of the U. S. P. Convention as at present constituted is as follows: All incorporated Medical Colleges and Colleges of Pharmacy, and Schools of Medicine and Pharmacy connected with incorporated colleges and universities; incorporated state medical and pharmaceutical associations; the American Medical Association; AMERICAN PHARMACEUTICAL ASSOCIATION; American Chemical Society; National Association of Boards of Pharmacy; and the National Association of Retail Druggists. Other societies and institutions represented are the Association of Agricultural Chemists; Association of American Dairy, Food and Drug Officials; National Wholesale Druggists' Association; National Dental Association; American Drug Manufacturers' Association; Mellon Institute of Industrial Research; School of Hygiene and Public Health of Johns Hopkins University; and the Federation of State and Medical Boards of the United States. Delegates are also admitted from the medical and pharmaceutical associations and universities of Porto Rico, the Philippine Islands, and from the Republic of Cuba, the U. S. P. having been officially adopted by the latter government.

In addition to the foregoing, delegates are also received from various local societies which were represented in the Convention prior to its incorporation in 1900.

The United States Government is directly represented in the Convention by eighteen delegates representing the Surgeons General of the Army, Navy and Public Health Service, the Department of Agriculture, the Department of Commerce and the United States Division of Customs, and is indirectly represented through the national associations named above, whose membership is composed mainly of those connected with the enforcement of state and national food and drug laws.

Trustees votes modest honoraria to the members of the Revision Committee in proportion to their respective services, but in no case equal to compensation for the work at commercial rates. Members of the Board of Trustees are repaid for their expenses incurred in the discharge of their duties.

PROFESSIONAL AFFILIATIONS OF MEMBERS OF THE GENERAL COMMITTEE OF REVISION.

Of the present members of the General Committee of Revision (fifty-one, including, ex officio, the President of the Convention), the professional connections are as follows:

One is connected in an executive capacity with the National Wholesale Druggists' Association, but is a trained botanist and pharmacognosist.

One is a research chemist connected with an institution devoted exclusively to research in technical lines.

Three are actively engaged in the practice of pharmacy.

Four are connected with the research departments of manufacturing pharmaceutical laboratories.

Seventeen are physicians engaged in the practice of medicine, or are teachers in medical schools, or both, or are engaged in scientific research in medical institutions.

Twenty-five, several of whom also hold the degree of M.D. in addition to other degrees, are teachers in schools or colleges of pharmacy.

Representatives of the schools of pharmacy are the most numerous of any class for the reason that pharmaceutical technique, chemistry, botany and pharmacognosy constitute the principal subjects involved in the work of revision, and are, therefore, very properly entrusted to those who are specialists in these lines.

In proportion to their assigned part in the research work, the representation of medicine is larger than that of pharmacy, since, aside from certain pharmacological and biological studies, the principal function of the physicians upon the Committee is to report upon the drugs and preparations to be admitted to or excluded from the Pharmacopœia.

The criticism is frequently offered that practicing physicians and pharmacists upon the Revision Committee are too few in number, but for this fact physicians and pharmacists are themselves solely responsible. During the several months preceding the last Convention it was common for the presidents of medical societies to report that it was extremely difficult to find physicians willing to accept appointment as delegates. Similar difficulty is met in attempting to persuade retail pharmacists to attend the meetings of the Convention or to accept working appointments upon the Committee of Revision. Apparently the majority of pharmacists and physicians are content to leave the work of revising the Pharmacopœia largely or entirely in the hands of professors in the colleges of pharmacy and medicine, confining their own contributions to criticisms of the work after it is issued.

FUNCTIONS OF THE COMMITTEE OF REVISION.

The General Committee of Revision is subdivided into fifteen sub-committees to each of which is assigned some special group of drugs or preparations for in-

vestigation, or some other particular line of research. The fifteen chairmen of the sub-committees constitute what is known as the *Executive Committee*, which is immediately in charge of all revision work.

Under authority of the Board of Trustees there is maintained a continuous search of the world's literature for articles upon subjects in any way related to pharmacopœial revision. All such articles, amounting to hundreds annually, are abstracted, translated when necessary, and in printed or mimeographed form are made available to the members of the sub-committees, who thus have before them at all times a review of whatever is being done in any part of the world bearing upon the subjects they have under investigation.

Only those who have been intimately connected with pharmacopœial work can have any adequate idea of the prodigious amount of labor involved in the task of revision. Sometimes an investigation requiring weeks of intensive laboratory research may yield no more than a physical or chemical constant which will be expressed in a single line or less of the final text.

FUNCTIONS OF THE SUB-COMMITTEE ON SCOPE OF THE PHARMACOPŒIA.

One of the most important of the sub-committees is the *Sub-Committee on Scope of the Pharmacopœia*, composed mainly of the physicians on the General Committee of Revision, but also including five pharmacists, the function of which is to decide primarily upon the drugs and preparations to be admitted to the next Pharmacopœia and those to be deleted therefrom.

Since the pharmacopœial list can, at most, include only a few hundreds of the many thousands of mineral, animal, vegetable and chemical agents which may be used medicinally, the principle upon which the admission of a drug is decided is not the *mere possession of medicinal properties*, but what is termed "therapeutic necessity."

To be entitled to rate as a therapeutic necessity the evidence concerning a drug or preparation should show:

(1) That its therapeutic usefulness is attested by sound medical opinion.

(2) That it possesses valuable properties not sufficiently represented by other drugs already included in the Pharmacopœia.

(3) That it is not privately controlled, or a drug of secret composition.

(4) That it is prescribed by physicians with sufficient frequency to render its standardization a matter of practical importance.

Decisions as to admissions and deletions are not made arbitrarily, nor are they based upon purely theoretical considerations. If there is substantial evidence to show that a given drug possesses valuable properties not equally represented by other official drugs, and that there is a material demand for it in the practice of medicine, the vote will be in favor of its admission; if such evidence is wanting the vote will be adverse.

One of the methods of obtaining evidence is by careful analysis of several hundred thousands of prescriptions from the files of pharmacists at various points in the United States. From a careful study of these prescriptions, and of such other data as are obtainable, supplemented by the personal knowledge and experience of its members, the reports of the Sub-Committee on Scope are made out, and these reports are accepted as final unless re-opened for further consideration by a two-thirds vote of the General Committee of Revision.

THERAPEUTIC USEFULNESS PROVED BY CLINICAL OBSERVATION.

Unfortunately all of the methods available to the laboratory technician are of limited application in the proving of therapeutic usefulness, and of the multitude of new drugs introduced with flattering reports from the pharmacological laboratory only a very small number win a permanent place in materia medica.

Experiments upon the lower animals are frequently of great value in explaining the action of drugs upon the human organism, and at times are strongly suggestive of their medicinal use, but the only decisive evidence of the therapeutic utility of a medicinal agent is that derived from careful observations of its effects when administered to the human patient. After the pharmacologist has told us whether a drug should be classed as an analgesic, hypnotic, cardiac depressant or stimulant, etc., it still remains for the clinician to determine to what extent its properties can be made useful in the treatment of disease. The supreme test of therapeutic usefulness must always be the results of clinical experience, and the final verdict will always be delivered by the clinician.

With certain drugs clinical observations have been so numerous and the conclusions have been so nearly unanimous that their respective therapeutic value may be said to be established with a high degree of certainty, but with respect to numerous others, opinions may be so widely divergent that drugs considered by some physicians to be of great importance are by other physicians of equal eminence considered to be of little or no value.

It may fairly be said, therefore, that the usefulness or lack of usefulness of a given drug in the treatment of specific departures from health is largely a matter of opinion based upon clinical observations, the value of which will depend upon the competency of the observers, upon the care with which the observations are made, and upon the number of cases in which its effects have been observed.

A PRIORI CONCLUSIONS FREQUENTLY MISLEADING.

Efforts to deduce the therapeutic values of drugs from *a priori* considerations have rarely been successful, and on more than one occasion have proved misleading.

For example, when it was discovered that many plant drugs contained various chemical entities, such as alkaloids, glucosides, volatile oils, etc., nearly all of which were active physiological agents, the theory was advanced that drugs in which such principles could not be discovered by chemical methods must necessarily be inert and valueless.

Many of the present generation can remember when eminent therapeutists taught that the only value of Cod Liver Oil was that of a fatty food which might better be replaced by other fats less liable to disturb the digestive processes. Notwithstanding this condemnation on theoretical grounds, various practical-minded practitioners clung to this old-fashioned remedy for the very excellent reason that they obtained results from its use which could not be obtained from any of its suggested substitutes. To-day with the aid of the newer biological methods, we have learned that the valuable properties of Cod Liver Oil are not merely imaginary, and it is now definitely recognized as having an important place in modern materia medica.

If during the prevalence of the earlier theory of active principles certain of the vitamin-containing substances had been proposed for the treatment of rickets,

scurvy, etc., they would undoubtedly have been condemned as valueless by some authorities and might also have been denounced as fraudulent.

These and numerous other examples which might be cited suggest the thought that when a drug has been long in medical use with apparently favorable clinical results, we should hesitate to condemn it as valueless simply because it does not contain an active constituent discoverable by present known methods, or because we cannot reconcile its reputed usefulness with existing theories of drug action.

THE LIMITED LIST OF REMEDIES EMPLOYED BY INDIVIDUAL PHYSICIANS.

No physician will ever have occasion to use all of the drugs listed in the Pharmacopœia, or even any considerable proportion of them. As a matter of fact, the average physician regularly employs only a comparatively small list of remedies from which he rarely departs.

If, however, a large number of physicians were to name the drugs they deemed useful, the lists would exhibit a wide range of therapeutic agents. Outside of a few staple drugs found in nearly all of the individual lists, there would be great variation in the preferences of different physicians.

Such differences in drug requirements are because of differences in the classes of patients which physicians see, and variations in the conditions under which they practice. The eye and ear specialist will naturally use remedies not needed by the nose and throat specialist, and neither of these will need some of the remedies very important to the stomach specialist; while the general practitioner will naturally require a different assortment of drugs than the physician who confines his practice to a small group of related diseases. Physicians in crowded industrial districts will meet with classes of patients requiring the use of remedies rarely or never employed by those who practice in thinly populated rural sections; and physicians located on the dry mountain plateaus will have different drug needs than those who practice in the moist interior valleys or coastal plains, etc.

It will, of course, be conceded that the physicians of each class are best qualified to decide upon the remedies most necessary for themselves, but this is also equivalent to saying that no single class of physicians is qualified to pass final judgment upon the therapeutic requirements of other classes.

The Pharmacopœia being in the nature of a public document and having a general public purpose, must provide for the therapeutic requirements of all classes of physicians: for the various specialists and for general practitioners; for those who enjoy hospital facilities and those who must practice without them, and also for the varying requirements of those who practice under differing climatic and social conditions.

NECESSITY FOR LIMITING THE PHARMACOPŒIAL LIST OF DRUGS.

While at first thought it might seem reasonable that every drug known to be possessed of useful properties should be standardized by the Pharmacopœia, there are nevertheless some very practical reasons for restricting the official list to moderate proportions.

One of these practical reasons is the importance of avoiding needless multiplication of medicinal agents which have practically the same therapeutic properties. For example, there are hundreds of laxative drugs, and perhaps thousands

which are astringents. There are many iron preparations with substantially equivalent medicinal properties, and a very considerable number of mercurial compounds, the properties of which are practically the same. Besides these there are the salts of numerous other metallic bases and a multitude of synthetic organic compounds, many of which have very similar or identical properties. To include and standardize all of these thousands of drugs would increase the Pharmacopœia to encyclopedic proportions by the mere multiplication of therapeutic equivalents without adding to the means of combating disease.

No sharp dividing line can be drawn between drugs which are therapeutic necessities and those which are not. Probably there will always be certain drugs admitted to the Pharmacopœia which some physicians will consider unnecessary, and some omitted which other physicians will think should have been included. The best the Committee can be expected to do is to give careful consideration to the evidence on all sides, and to avoid taking an extreme view on any side.

PRIVATELY CONTROLLED AND NEWLY INTRODUCED REMEDIES NOT ELIGIBLE TO ADMISSION.

In addition to the exclusion of unnecessary therapeutic equivalents, privately controlled drugs and articles of secret composition are likewise excluded, regardless of their possible remedial values or of the extent of their employment by physicians.

Every proprietary drug is a law unto itself, and has the title and standards of composition and strength which its proprietor is pleased to adopt, and which he may change at will. If the Pharmacopœia should prescribe a different title and a different standard of purity and strength than those fixed by the proprietor, it would no longer be the same product, and such liberties might also be construed as an unlawful interference with property rights. On the other hand, should the Pharmacopœia accept the title and standards fixed by the owner, nothing would be accomplished except the gratuitous advertisement of the proprietary article. Obviously, therefore, privately controlled products have no proper place in the Pharmacopœia.

This rule of exclusion does not apply to products marketed under controlled titles but which can also be freely produced and sold under other names. If such products are considered to be therapeutic necessities the Committee may admit them under distinctive titles and may prescribe the standards of strength and purity with which they should comply when dispensed under such titles.

So, likewise, a privately controlled drug may be admitted after it loses its proprietary character. Some of the oldest drugs and preparations included in the U. S. P., as Rochelle Salt, Glauber's Salt, Dover's Powder and various others, were originally introduced as nostrums, or "patent medicines," but their proprietary character having lapsed, they can now be admitted to the official list with entire propriety.

Since the Pharmacopœia is intended to be a repository of agents of established merit, and not as a proving ground for untested drugs, admission is also refused to new or recently introduced remedies. Probably several hundred new remedies are introduced to the medical profession each year, of which perhaps not more than one or two gain permanent acceptance, while the others are speedily forgotten.

Not until a drug has been used for a sufficient length of time and by a sufficient number of physicians to demonstrate its therapeutic utility, and that its use is not merely a passing fad will it be considered as eligible for admission to the official list.

EXCLUSION FROM PHARMACOPŒIA DOES NOT IMPLY ABSENCE OF THERAPEUTIC VALUE.

The omission of a drug from the official list does not necessarily imply that it lacks valuable medicinal qualities. There is no reason, for example, to presume that many of the preparations of iron, mercury, arsenic and other metals, or of the laxative, astringent, hypnotic and analgesic drugs which have been excluded from the official list are any less efficient than some of those which have been admitted.

If a drug is unused by physicians, if its medicinal qualities are fully represented in other drugs already recognized, or if it is a newly introduced or a secret or proprietary remedy it cannot be considered a therapeutic necessity in the pharmacopœial sense, no matter how great its medicinal value from the theoretical standpoint.

Therapeutic fashions vary less frequently, perhaps, but not less certainly than feminine fashions in hats and gowns. An official drug may lose its popularity with physicians and be dropped from the Pharmacopœia, then at a later date again come into frequent use and be re-admitted. If one of the present official iron preparations should cease to appear on prescriptions during the next ten years, it will be discarded; and if any of the preparations now omitted shall appear with sufficient frequency in prescriptions during the next decade they will be regarded as therapeutic necessities and admitted to the next official list. Such alterations in the official status of drugs may occur with any revision of the Pharmacopœia.

It should be remembered that the U. S. P. was originally planned exclusively for the guidance of physicians and of those who produce and dispense medicines on physicians' prescriptions or for physicians' use, and that the U. S. P. Convention has never authorized a change in this original plan. Whether in order to meet modern conditions its scope should be expanded to include all drugs which have an extensive medicinal use, whether employed by physicians or not, is an open question, but until the Convention shall authorize such a radical departure from the policy established more than a century ago, the Committee on Scope will have no other option than to consider primarily the needs of practicing physicians.

The complete liberty of the physician to select whatever remedy his judgment suggests as proper for his patient is of the first importance, and is so recognized by the revisers of the Pharmacopœia. Every manual of materia medica and therapeutics, and every professor who teaches these subjects describes and recommends numerous drugs not included in the official list. If the physician desires to use one of these non-official drugs he is at perfect liberty to do so, and in fact it is by such excursions outside of the official list that the usefulness of new remedies is discovered. If he desires to use a patented or proprietary preparation, as he frequently does, he has the literature of the manufacturer for guidance, or if he

prefers less biased advice, he can consult *New and Nonofficial Remedies*, published by the American Medical Association, for information concerning its composition and claims, and also to learn whether it complies with the rule against advertising to the laity, and with the other ethical rules of that association.

RELATION OF THE PHARMACOPŒIA TO THE FOOD AND DRUGS ACT.

The United States Constitution provides that: "All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives."

As construed by the courts this grant of law-making power is exclusive, and cannot be delegated by Congress to another department of government nor to any other agency, either public or private.

This rule, however, does not operate to prevent the law-making body from conferring upon an excutive department authority to make regulations necessary to the enforcement of a law, provided such regulations do not alter the intent or scope of the law as enacted by Congress.

It has also been held that Congress can enact a law in which authority is delegated to some other agency to ascertain or determine a fact or state of things upon which it is intended the operation of the law shall depend.

From the nature of their constitution legislative assemblies are not qualified to conduct scientific investigations nor to make technical measurements of physical phenomena, and if, for the purposes of the law, they could not authorize the acceptance of the physical and chemical constants of nature as determined by other agencies, they would be unable to provide for some of the most important needs of an age in which the application of technical and scientific data are common incidents of every-day life.

Keeping these considerations in view, is it a fair question whether the mention of the U. S. P. in the Food and Drugs Act of June 30, 1906, constitutes a delegation of legislative power to the semi-public corporation known as the United States Pharmacopœial Convention?

The question of constitutionality was considered when the Act was drafted,[1] and a careful reading of its language will disclose the fact that it nowhere declares that the U. S. P. and N. F. shall be accepted as standards of the law, and nowhere declares or implies that manufacturers of drugs must follow their prescribed formulas or processes.

The first mention of the U. S. P. and N. F. occurs in Section 6, which declares "*That the term 'drug' as used in the act, shall include all medicines and preparations recognized in the United States Pharmacopœia and National Formulary for internal or external use, and any substance or mixture of substances intended to be used for the cure, mitigation, or prevention of disease of either man or other animals.*"

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[1] NOTE: An important part in the formulation of the text of the act was taken by the old "National Food and Drug Congress," a voluntary association of food and drug chemists, retail druggists, representatives of colleges of pharmacy, of manufacturing pharmacists and of other interests, which formerly met annually at Washington for the purpose of considering proposed legislation relating to the adulteration and misbranding of foods and drugs. Some years after the passage of the Act of June 30, 1906, this society was re-organized into what is now known as the "Association of American Food, Drug and Dairy Officials."

From a study of this language it will be observed that the entire substance of the definition is concentrated in the second clause, *"any substance or mixture of substances intended to be used for the cure, mitigation or prevention of disease of either man or other animals,"* which clause taken alone is sufficiently comprehensive to cover all drugs of every kind. The only effect of the first clause, therefore, is to emphasize the fact that, as far as the law is concerned, U. S. P. and N. F. drugs are on the same footing as all others, and are not entitled to special consideration because of their inclusion in these two volumes.

Since the first clause neither extends nor restricts the scope of the definition as intended by Congress it can hardly be contended that mention of the United States Pharmacopœia and National Formulary constitutes a delegation of legislative power to the makers of these two volumes.

The second reference to the U. S. P. occurs in Section 7, in which it is declared that an article shall be deemed to be adulterated: *"If, when a drug is sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as determined by the test laid down in the United States Pharmacopœia or National Formulary official at the time of investigation."*

It will be noted that this language does not declare that drugs shall possess the qualities prescribed by the U. S. P., but requires only that *when sold under pharmacopœial titles they shall be of pharmacopœial quality.*

To insure certainty in the important functions of compounding and dispensing, the titles of the U. S. P. are derived from the Latin, or are latinized in form, and have specific implications developed through more than a century of pharmacopœia-making, in order that a prescription shall mean exactly the same thing to a pharmacist in Portland, Oregon, as to a pharmacist in Portland, Maine.

The correct use of drug titles is one in which the issues of life and death are closely involved, and disaster is almost certain to result from the dispensing of a drug of different composition and strength than that intended by the prescriber. It was for the express purpose of preventing jeopardy to human life through the loose and inaccurate application of titles in the dispensing of medicines that the U. S. P. was founded and its specialized nomenclature developed, and this constitutes one of the principal reasons for the continuance of that volume.

Before there was a Food and Drugs Act it was always understood that the use of a U. S. P. title upon a drug implied that it was of U. S. P. strength and quality, and it was always understood also that the intentional dispensing of an article of different strength and quality was a fraudulent act. The only effect of the law, therefore, is to add its sanction to this long standing rule of common honesty.

To further make it plain that the only intent of this section is to prevent the *misuse* of the official titles the statute adds the proviso: *"that no drug defined in the United States Pharmacopœia or National Formulary shall be deemed to be adulterated under this provision if the standard of strength, quality or purity be plainly stated upon the bottle, box or other container thereof although the standard may differ from that determined by the test laid down in the United States Pharmaocpœia or National Formulary."* This is stating about as clearly as it can be expressed in English that it is not the purpose of the law to compel manufacturers and dealers

to accept the standards of the U. S. P. and N. F., but to prevent them from using the specialized titles of these volumes as the cloak for fraud.

Under this language the manufacturer and dealer is at liberty to either accept or reject both the standards and the titles of the U. S. P. and N. F., or he is at liberty to use the titles upon articles of different quality, provided he does not use them deceitfully.

This obligation of producer and dealer does not vary from revision to revision, but always remains the same, namely, not to use an official title unless supplying official quality, or unless the difference be plainly stated on the label.

It is specifically stated in the Pharmacopœia that its prescribed standards of purity and strength "are intended to apply solely to substances which are used for medicinal purposes and when professedly bought, and sold or dispensed as such." This declaration automatically excludes the vast bulk of drugs and chemicals employed in the arts and industries, thus leaving to pharmacopœial supervision probably less than one per cent in bulk of such substances as found in commerce, and then "only when professedly bought, sold or dispensed" for medicinal purposes, in which case the requirement that they shall be true to the implications of their labels is an elementary and indispensable necessity of public safety.

In view of the guarded manner in which the U. S. P. is referred to in the Food and Drugs Act, and the evident intent both of the law and of the Pharmacopœia not to restrict the liberty of manufacturers and dealers beyond the requirement that they use truthful labels, it would seem to be a strained construction to hold that there has been an unconstitutional delegation of law-making power to the United States Pharmacopœial Convention.

Left, J. T. Humphrey, retiring Chairman of British Pharmaceutical Conference; right, A. R. Melhuish, President of British Pharmaceutical Society and of the Conference.

THE STABILIZATION OF SOLUTION OF ARSENOUS AND MERCURIC IODIDE, U. S. P. X.*, **

BY WILLIAM J. HUSA*** AND W. W. F. ENZ.

Solution of Arsenous and Mercuric Iodide, U. S. P. X, commonly known as Donovan's Solution, is notably poor in keeping qualities, the trivalent arsenic being gradually oxidized to pentavalent arsenic on storage under ordinary conditions. In a previous paper by the present authors (1) it was shown that the stability of Donovan's Solution is increased by the following factors: (*a*) storage in amber-colored bottles, (*b*) storage in well-filled bottles, (*c*) storage in a refrigerator, (*d*) replacement of the air in the bottle by an inert gas, (*e*) replacement of 25% of the water by honey or syrup, (*f*) by neutralization of the solution with KOH, (*g*) by use of a modified formula proposed by the authors and (*h*) by the addition of stabilizers, of which the most effective were calcium carbonate, oxalic acid, methenamine and terpin hydrate.

The usual method of procedure for comparing the stability of the various solutions was to expose 50-cc. samples, contained in ordinary 2-oz. prescription bottles, in diffused light and sunlight. The deterioration under these conditions was more rapid than in well-filled, amber-colored bottles and it was thus possible to secure quicker results. At the conclusion of the previously reported work outlined above, other experiments were started to throw further light on the comparative value of the various methods of stabilization under drug store conditions,

TABLE I.—DETERIORATION OF DONOVAN'S SOLUTION STABILIZED IN VARIOUS WAYS, WHEN STORED IN PINT AMBER-COLORED BOTTLES IN DIFFUSED LIGHT.

Solution No.	Description of solution.	Date of preparation.	Gm. AsI_3 in 100 cc. originally.	Gm. AsI_3 in 100 cc. after 10 months.*	Deterioration after 10 months.
I	Modified formula proposed by authors	5–21–29	1.005	0.996	0.9%
II	Same as I, but separately neutralized	5–21–29	1.005	0.999	0.6%
III	Donovan's Solution (control)	5–22–29	0.991	0.868	12.4%
IV	Neutralized with KOH	5–22–29	0.940	0.845	10.1%
V	Saturated with CO_2	5–22–29	0.976	0.891	8.7%
VI	Neutralized with KOH and saturated with CO_2	5–22–29	0.940	0.883	6.1%
VII	Air replaced by H_2	5–22–29	0.991	0.867	12.5%
VIII	Neutralized with KOH and air replaced by H_2	5–22–29	0.940	0.871	7.3%
IX	$CaCO_3$ added (1.4 Gm. per pint)	5–22–29	0.991	0.932	6.0%
X	Terpin hydrate added (1.9 Gm. per pint)	5–22–29	0.993	0.911	8.3%

* Exact date of analysis: 3–13–30.

* This investigation was aided by a grant from the AMERICAN PHARMACEUTICAL ASSOCIATION Research Fund.

** Scientific Section, A. PH. A., Baltimore meeting, 1930.—No Discussion.

*** Professor of Pharmacy, University of Florida.

i. e., starting with well-filled amber-colored bottles stored in diffused light, portions of the contents being withdrawn from time to time. Pint amber-colored bottles, fitted with rubber stoppers, were used. The results are summarized in Table I.

Amounts withdrawn: 30 cc. on 12–14–29, 35 cc. on 3–5–30, 30 cc. on 3–13–30, 30 cc. on 3–25–30.

A test was also made to determine the effect of replacing 15% of the water by syrup. It was found that the U. S. P. method of analysis for trivalent arsenic was not reliable in this case, due to the fact that some iodine was used up in oxidizing glucose formed by hydrolysis of the sucrose.

DISCUSSION OF RESULTS.

Replacement of Air by Inert Gases.—The method of replacing the air in the bottle by an inert gas was partially effective using carbon dioxide but ineffective with hydrogen. This method might be applicable to small bottles which would be dispensed as soon as opened, but is not very effective for stock bottles, due to escape of the gas and entry of air each time the bottle is opened. As would be expected under these conditions, a gas heavier than air, such as carbon dioxide, is superior to a light, fugitive gas such as hydrogen.

Effect of Neutralization.—Donovan's Solution neutralized with KOH, using methyl orange as indicator, was somewhat more stable than the control. A more pronounced stabilization resulted when the solution was neutralized and the air replaced by carbon dioxide or hydrogen.

Effect of Calcium Carbonate.—The addition of 1.4 Gm. of calcium carbonate per pint of solution reduced the rate of deterioration by about 50%. The calcium carbonate reacts with the HI present in the solution; this results in a more favorable p_H and the carbon dioxide liberated replaces part of the air in the bottle. To avoid loss of carbon dioxide, the solution was not filtered after addition of the calcium carbonate; there was a slight sediment in the bottle after 10 months.

Effect of Terpin Hydrate.—Terpin hydrate had a slight preservative influence. After 10 months there was a very slight sediment and the solution had a terpene-like odor.

Modified Formula.—Details have already been published (1) for the preparation of Donovan's Solution by a modified formula proposed by the present authors, the change lying in the use of As_2O_3, HgI_2 and KI in place of AsI_3 and HgI_2. This solution showed less than 1% deterioration after 10 months, as compared with a deterioration of 12.4% for the U. S. P. X solution. This modified formula appears worthy of serious consideration in connection with pharmacopœial revision. The method of preparation is somewhat longer and more complicated than the present official process and would thus seem to be better suited to large scale manufacture than to extemporaneous preparation. However, unless a change is made in the official formula, it seems desirable if not imperative that the next revision of the U. S. P. should require that Donovan's Solution be freshly prepared just before dispensing.

SUMMARY.

1. Experiments have been carried out to determine the comparative value under drug store conditions of various methods of stabilizing Donovan's Solution.

2. After 10 months, the % deterioration was as follows: modified formula proposed by authors, less than 1%; control, 12.4%; neutralized with KOH, 10.1%; saturated with CO_2, 8.7%; neutralized with KOH and saturated with CO_2, 6.1%; air replaced by H_2, 12.5%; neutralized with KOH and air replaced by H_2, 7.3%; $CaCO_3$ added, 6.0%; terpin hydrate added, 8.3%.

3. The modified formula proposed is worthy of serious consideration in connection with pharmacopœial revision.

4. It is recommended that in the next revision the U. S. P. should adopt a modified formula for Donovan's Solution, or require that the solution be freshly prepared just before dispensing.

REFERENCE.

(1) William J. Husa and W. W. F. Enz, JOUR. A. PH. A., 19 (1930), 328.

COLLEGE OF PHARMACY,
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TEACHER-TRAINING IN PHARMACY.*

BY E. T. MOTLEY.

It is the chief aim, perhaps, of all of our schools and colleges of pharmacy to train young men and women to become practicing pharmacists, either as retail pharmacists, analysts or manufacturing pharmacists. Although this sort of training is, to be sure, very essential, I am inclined to believe that more emphasis should be placed upon the training for teachers in pharmacy in the future than has been done in the past. It seems to me that there is a demand, even to-day, for well-trained teachers in our schools and colleges. This belief was made more impressive during the past year in looking about for an additional member to our Teaching Staff. Some of the applicants for this position had apparently had no specialized training for qualifying them as teachers. A Dean of one of the larger schools also informed me that he had had seven or eight requests for positions to be filled during the past year, and that there never was a time, to his knowledge, when there were more opportunities for teachers of pharmacy. The recent advances in pharmaceutical education have naturally increased the demand for well-trained teachers of pharmacy.

The teaching profession is, doubtless, one of the least selfish and most poorly paid of all the professions. A teacher is required to give his time, knowledge, sympathy and understanding most freely and unselfishly. A paper, presented by Dean Rudd at the Portland meeting, entitled "Professors of Pharmacy" seems to confirm the above statement. In fact, I have long since concluded that all Pharmacy teachers should never expect to become over-burdened with wealth. However, there should come to all of us who profess to teach, a joy and satisfaction in knowing that we are training young men and women for an important and honorable profession.

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* Section on Education and Legislation, A. PH. A., Rapid City meeting, 1929.—No discussion.

It may be true that very few of our students in pharmacy have the desire to become teachers. Yet, occasionally, there may come to us a student who impresses us as perhaps belonging to that very rare type of so-called "Natural-born" teachers, and maybe one of the "Half-born" type, who, if given proper advice and encouragement, will resolve to qualify for teaching. Proper advice and encouragement from faculty members will often result in great good. Certainly, students of these types should be given every opportunity to prepare themselves as teachers.

The question may now arise, "How and When Should Teacher-Training in Pharmacy be Given?" I do not claim, in the least, to even partly answer this question. What little I may say, or suggest, toward answering this, has resulted, partly, from conferences with heads of the Departments of Education, English, Psychology and Philosophy in the University of South Carolina. It seems to me that this specialized training should not be delayed until the student is doing graduate work. It is, of course, possible to give some, if not all, of this work during the graduate years, but, usually, a student's time in graduate work is devoted almost entirely to specialized technical pharmacy. If it is not possible, or practical, to include in our curricula so-called "Teacher-Training Courses," as are usually given in Departments or Schools of Education, then, it would seem proper to require students, who are enrolled in four-year courses in pharmacy and desiring to teach, to choose as electives such courses as Applied Psychology, Public Speaking and History of Education. Just how these electives should be best distributed is a question. After completing such a four-year course, the student should, by all means, be urged and aided to continue work leading to the higher degrees. The importance of graduate education in pharmacy was strongly set forth in a paper presented by Dr. Jenkins at the Portland meeting. The establishment of research and teaching fellowships in more of our schools would greatly aid in this direction. Unfortunately, a number of our schools do not have such to offer students.

Although much has been and is being done in our schools in preparing young men and women as teachers of our profession, there still remains much to be done in the future. May we, as individual faculty members, see to it that students in our schools, whom we believe properly qualified and desiring to become teachers, be given every encouragement and opportunity to acquire that end. By so doing, I firmly believe that the supply of well-trained teachers in pharmacy in the years to come will be sufficiently great, and that pharmacy will be rightly recognized.

NORTH CAROLINA AND INDIANA CHAIN STORE TAX.

The North Carolina license tax on branch and chain store operators is constitutional, the State Supreme Court has held. It is expected that an immediate appeal will be taken by the stores to the Supreme Court of the United States.

The validity of the Indiana chain store tax law is involved in a case now pending in the Supreme Court of the United States entitled State Board of Tax Commissioners of the State of Indiana *vs.* Jackson, No. 183. The Indiana law is invalid, the Federal District Court for the Southern District of Indiana (three judges sitting) held, and an appeal from that decision was taken by the Indiana State Board.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

WHY PEOPLE PREFER THE PHARMACIST.

BY PAUL C. OLSEN.

The title of this article may seem to be unduly optimistic. Many people will consider it so because of the volume of business which formerly went unquestioned to the drug store, but which to-day is going in important amounts to department stores, variety stores, mail order houses, house to house canvassers and a considerable number of other and newer types of retail distributors.

I don't want to minimize the importance of this business which has been diverted from the retail drug stores of the country. I simply want to try to indicate what the situation is and what seem to me to be the reasons for its existence.

One of the most important classes of merchandise in which other types of retail stores are now aggressive and successful competitors of retail drug stores is that of toilet goods. The principal competitors in this field are department stores, variety stores and beauty shops. Barber shops are also a small factor.

The reason, in my judgment, that this business has gone to these other outlets is the failure of a great many druggists to capitalize effectively the natural advantages which a pharmacist has in the sale of toilet goods. These natural advantages result from the necessary training and experience he must have to become a licensed pharmacist. This necessary training and experience means that he understands the composition and purposes of pratically every line of toilet goods.

On the other hand, the department stores and beauty shops, with far less scientific training and understanding of the compositions and purposes of toilet goods, have achieved greater success in the sale of this merchandise. This success has come because of their superior knowledge of the purposes these preparations serve, and the selling appeals employed to stimulate sales.

The lack of practical use for much of the scientific training with which students in colleges of pharmacy are equipped to-day is frequently decried. My own judgment is, that the real weakness is a failure on the part of many pharmacists to take advantage of opportunities, such as those described above, to make profitable use of this scientific training. Perhaps, also, there is a failure to make clear to students the specific ways in which scientific training may be of profitable service in many retail drug stores.

Patent medicine stores and their variant, perfume shops, are other directions in which the business, which formerly was exclusively that of retail drug stores,

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is believed to be diverted now. Patent medicine stores may be as elaborately equipped as drug stores and include in their stock practically everything drug stores carry, except the lines which the law, for reasons of public health and safety, restricts to licensed pharmacies. The perfume shops, so-called, generally have the bulk of their stock, as the name indicates, in toilet goods and a few related and popular lines.

Still another variation is the candy and ice cream parlor or the exclusive soda fountain and luncheonette. In such stores there occur frequently calls for aromatic spirit of ammonia, headache remedies and similar preparations which are dispensed at a soda fountain. It is just one step from dispensing them at the fountain to selling the preparations in original packages, and thus such stores are led into the sale of proprietary remedies.

The facts are, however, that stores in the groups above seldom achieve permanent success in the sale of medicinal preparations. The reason is not difficult to find. A person who undertakes self-medication, however simple the treatment that is indicated, likes to be assured that the person from whom he buys the medicine is familiar with its character and purpose. The purchaser has greater confidence, therefore, in dealing with a pharmacist in matters of this kind, than with a person who does not have the scientific training and experience which a pharmacist is required to have.

This is one more illustration of the economic value to a pharmacist of the prescription department. It is of vital importance, not only for itself, but also because of the prestige and standing which it gives to the store and to many lines of merchandise which are sold and are not strictly prescription items.

That is why it has always seemed to me that there exists in a drug store an opportunity for the proprietor to take advantage of the prestige which pharmacy enjoys to promote the sale of toilet goods and many other items to which attention will be called. (It is well understood that the promotion by pharmacists of the sale of medicinal preparations requires them to distinguish between those preparations which can be safely sold directly to the people and the others which must be used only under professional direction.)

Toilet goods are not the only line in which there has been this frequent failure to make profitable use of the scientific training and experience with which pharmacists are equipped.

Years ago, the flavoring extract and spice business slipped away to grocery stores. This happened largely because of price competition. Any one familiar with the small and slow family use of flavoring extracts and spices knows that the saving from the purchase of inferior flavoring extracts and spices over a period of years is infinitesimal compared with the cost of the highest quality flavoring extracts and spices. It is well known, too, that the differences in quality of flavoring extracts and spices are amazing.

Tragically, pharmacists have known these two facts, but comparatively few of them have impressed them profitably upon their customers.

A somewhat similar situation has developed in the sale of insecticides and even of veterinary medicinal preparations. Seedsmen have become important outlets for this type of merchandise, largely because of their more comprehensive knowledge of the existing markets. It is unfortunate that few pharmacists have capitalized

the scientific knowledge they have of the composition and purposes of preparations in these fields to enlarge their sales of this class of merchandise.

Another field in which opportunities no doubt exist is in cleaning preparations. The selection of suitable cleaning preparations is complicated on account of the variety of fabrics in use to-day and the mixtures in woven textiles. The weighting of silk, also, has added complications to cleaning problems.

I emphasize these specific fields, because it is a well-known fact that people turn naturally to the pharmacist as the most accessible source of scientific knowledge and prefer to do business with such a qualified person.

Other retailers who have been able to secure considerable business in lines which formerly were sold exclusively in drug stores have had to overcome this natural advantage which the druggist has. It is a tribute to the merchandising skill of these other types of retailers that they have been able to successfully overcome this advantage which the pharmacist has.

It is interesting to contemplate the effect of the use by pharmacists of similar merchandising ability. The scientific training and experience of pharmacists plus the natural preference people have for dealing with pharmacists in the purchase of merchandise of the classes named in this article give to pharmacists outstanding advantages which it certainly appears that skilful merchandising can capitalize effectively.

These facts force the conclusion that scientific training and experience is an invaluable and priceless advantage of the retail pharmacist which, with aggressive and skilful merchandising, he can make of even greater benefit to himself and to the community he serves.

DISEASE NAMES ON LABELS.

A decision by Judge Thomas, of the United States District Court at Hartford holds that a drug product is not misbranded under the Food and Drugs Act when it possesses some therapeutic or curative value in connection with the treatment or mitigation of the ailments or diseases for which it is advertised. The decision differs from the policy of the Food, Drug and Insecticide Administration of the United States Department of Agriculture, in attempting to secure the removal of disease names from labels and advertisements of proprietary medicines.

We quote the interpretation of Judge Thomas of the Food and Drugs Act in the following:

"In the use of the words therapeutic and curative, as set forth in the statute, it seems clear that these words were intended by the Congress to be given their ordinarily accepted meaning, and while they have a certain meaning to the expert doctor, nevertheless they are a part of the vocabulary of any intelligent person. Therapeutics to the medical world means to heal; to make well; to restore to health. It is that branch of medicine dealing with the proper use of the right medicines in the treatment of disease. The medical student studies Therapeutics for the purpose of learning about different medicines to prescribe for the many ills to which the flesh is heir, in order to assist nature to make a sick patient well. The ordinary definitions found in the dictionaries are as follows: Having healing qualities; curative; alleviative; a medicine efficacious in curing or alleviating disease. Webster defines Therapeutics as that part of medical science which treats of the discovery and application of remedies for diseases. The word, curative, is not found in the medical dictionaries. The regular dictionaries define the word as "possessing or tending to cure; relating to the cure of disease; relating to or employed in the cure of disease; tending to cure. In none of the definitions is there a suggestion that the words, therapeutic or curative, convey the meaning of absolute cure. The testimony of the experts shows that a therapeutic or curative agent is something which alleviates or tends to cure a disease, and that, except in a few instances, there is no medicine which, of itself, is an absolute cure for disease."

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

President, W. M. Hankins, Daytona, Fla. J. W. Gayle, *Treasurer*, Frankfort, Ky. Chairman of Executive Committee, A. C. Taylor, Washington, D. C. *Secretary*, H. C. Christensen, 130 N. Wells St., Chicago, Ill.

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D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming
		Porto Rico	

PRESIDENT HANKINS APPOINTS COMMITTEES.

President W. M. Hankins of Daytona Beach, Fla., recently announced the appointment of the following committees to serve until the Miami convention in July 1931:

LEGISLATIVE COMMITTEE.

A. L. I. Winne, *Chairman*, Richmond, Va.; R. B. Rothrock, Mt. Vernon, Ind.; C. Thurston Gilbert, Noroton, Conn.

COMMITTEE ON NATIONAL LEGISLATION.

A. C. Taylor, *Chairman*, 150 C St., N.E., Washington, D. C.; A. L. I. Winne, Richmond, Va.; Geo. A. Bunting, Baltimore, Md.

COMMITTEE ON PHARMACY OWNERSHIP LAW.

Jacob Diner, *Chairman*, 440 West End Ave., New York City; M. N. Ford, Columbus, Ohio; Herbert M. Lerou, Norwich, Conn.

N. A. B. P. COMMITTEE ON PREREQUISITE LEGISLATION.

Coöperating with similar committees of the A. PH. A. and A. A. C. P.

Wm. R. Acheson, *Chairman*, 33 Belmont St., Cambridge, Mass.; Arthur L. Phelps, Phoenix, Ariz.; Charles S. Pierce, Springvale, Me.; Owen W. McShane, Poultney, Vt.; R. C. Shultz, Worland, Wyo.

COMMITTEE ON NATIONAL CERTIFICATE.

H. C. Christensen, *Chairman*, 130 N. Wells St., Chicago, Ill.; Frank S. Ward, Portland, Ore.; P. H. Costello, Cooperstown, N. D.; H. W. Reuter, St. Louis, Mo.; J. A. Riedel, Boulder, Mont.; Fred J. Creutz, Wausa, Neb.

COMMITTEE ON CONSTITUTION AND BY-LAWS.

F. H. King, *Chairman*, Delphos, O.; Booker Latimer, Dewitt, Ark.; W. H. Dayton, Salt Lake City, Utah; Kelly Patterson, Jackson, Miss.; W. E. Harter, New Orleans, La.

COMMITTEE ON BANQUET ARRANGEMENTS.

L. L. Walton, *Chairman*, Williamsport, O.; L. C. Lewis, Tuskegee, Ala.; Mac Childs, Eldorado, Kans.; John K. Clemmer, Miami, Fla.; Sam B. Mitchell, Sumpter, S. C.

GRIEVANCE COMMITTEE.

Henry G. Ruenzel, *Chairman*, 2332 Vliet St., Milwaukee, Wis.; J. P. Halliwell, Pocatello, Idaho; Edward H. Walsdorf, New Orleans, La.; Guy C. Norton, Tacoma, Wash.; R. W. Fleming, Reno, Nev.

DEPARTMENT OF EDUCATION.

Robert L. Swain, *Director*, 2411 N. Charles St., Baltimore, Md.

Advisory Committee: A. L. I. Winne, Richmond, Va.; Roy Cook, Charleston, W. Va. A. L. Phelps, Phoenix, Ariz.; Hal Duncan, Birmingham, Ala.; L. L. Walton, Williamsport, Pa.; Robert P. Fischelis, Trenton, N. J.

COMMITTEE ON STUDY OF PHARMACY OF AMERICAN COUNCIL ON EDUCATION.

L. L. Walton, *Chairman*, Williamsport, Pa.; A. C. Taylor, Washington, D. C.; H. C. Christensen, Chicago, Ill.

DELEGATES OR REPRESENTATIVES TO:

Drug Trade Bureau of Public Information: Robert P. Fischelis, Trenton, N. J.; H. C. Christensen, Chicago, Ill.

National Conference on Pharmaceutical Research: L. L. Walton, Williamsport, Pa.; Dean B. Crawford, Atlantic City, N. J.; W. E. Bingham, Tuscaloosa, Ala.

National Drug Trade Conference: A. C. Taylor, Washington, D. C.; Robert L. Swain, Baltimore, Md.; H. C. Christensen, Chicago, Ill. *Alternates:* Robert P. Fischelis, Trenton, N. J.; A. L. I. Winne, Richmond, Va.; L. L. Walton, Williamsport, Pa.

House of Delegates, A. Ph. A.: L. L. Walton, Williamsport, Pa.; J. W. Dargavel, Minneapolis, Minn.; C. M. Anderson, Oklahoma City, Okla.

Alternates: James L. Dow, Lancaster, N. H.; R. R. Ferrell, Memphis, Tenn.; I. W. Rose, Rocky Mount, N. C.

Committee on Simplified Practice, Bureau of Standards, U. S. Dept. of Commerce: A. C. Taylor, Washington, D. C.

National Association of Retail Druggists: L. L. Walton, Williamsport, Pa.

National Drug Survey Committee: A. C. Taylor, Washington, D. C.

STATE BOARD NEWS.

Arizona.—Secretary Arthur Lee Phelps of the Board is also serving as secretary for the Arizona Pharmaceutical Association. A copy of the October bulletin sent to all members of the Arizona association, edited by Mr. Phelps, reveals some interesting innovations. A "want ad" department shows four Arizona licentiates out of work, giving names and addresses, and also lists ten pharmacists from other states who have corresponded with the secretary regarding employment in Arizona and are eager to locate in that state if employment can be found. Such coöperation is certainly commendable in the present unemployment crisis as it prevents influx into the state on false hopes, which often has sad consequences when a job is not forthcoming. The secretary assumes no responsibility other than to state that the out-of-state applicant is eligible for Arizona license, and all correspondence is direct between the employer and the applicant. As Arizona has provision for temporary permit, this can be issued as soon as the N. A. B. P. credentials are filed, the applicant appearing at the next board meeting.

The semi-annual examination meeting of the Board was held on November 12th. Results will be published later.

Missouri.—Report shows that nine registered pharmacists and six assistants were registered as the result of the September examination, but no mention is made of the number of candidates participating.

New Jersey.—The annual report of the board of pharmacy for the fiscal year ending May 31, 1930, submitted to Governor Larson recently, indicates that there were 3925 registered pharmacists and 247 assistant pharmacists in good standing on the records of the board. Two written examinations and two practical examinations were conducted by the board in the year covered by the report, and a total of seventy-six pharmacists and thirty-one assistant pharmacists were granted registration.

There were forty-seven applicants who received registration by reciprocity based on licenses to practice in other states. Eleven pharmacists registered in New Jersey were granted registration by reciprocity in other states, three of them going to Illinois, three to Florida and one each to Arizona, New Hampshire, Kentucky, Texas and North Carolina.

The report calls attention to the fact that pharmacists registered in other states but ineligible for registration in New Jersey, have occasionally attempted to practice in this state. Such a procedure is unlawful. "A person who is not registered as a pharmacist in this State, says the report, "has no status as a pharmacist even if he is registered in another state. The board is compelled to prosecute such individuals whenever they assume prerogatives to which they are not entitled under the law."

Pharmacists who employ apprentices are urged, in the report, to record the apprenticeship of their clerks as soon as it is begun. Otherwise the board is unable to allow credit for the experience served by the applicant.

A summary of the inspections conducted by the board in the year covered in the report, indicates that a total of 3140 inspections was made and a total of 139 violations of the law was reported. This is less than 4 per cent. Most of the inspections were confined to pharmacies operated by registered pharmacists and a large number of the violations reported occurred in stores that were either not owned by registered pharmacists or were operated as so-called patent medicine stores.

The board, in its report, calls attention to the need for legislation which will provide for the annual registration of all pharmacies where prescriptions are compounded, and for the issuance of a permit by the board to operate such a pharmacy. This annual registration is necessary, according to the report, so that an accurate check may be kept on the activities of each store. The law requires that a registered pharmacist shall be in charge at all times, and under the proposed legislation the board would have the power to withdraw the permit from any owner operating his store without a registered pharmacist.

New Mexico.—The fall examination of the New Mexico Board was held in Albuquerque on October 20th–21st, with 35 candidates participating. The next meeting will be held May 18th at the same place.

Steps were taken by the board to see if the state university can establish a course in pharmacy, the intention being to ask for legislation requiring all applicants for examination to be graduates of a recognized school of pharmacy, provided that such a school can be established in the state.

Wisconsin.—The state board of pharmacy concluded its quarterly examination on October 25th. Out of 145 candidates, 49 were successful, thirty-six receiving the R.Ph. license and thirteen the assistant certificate.

The next examination is announced for January 19, 1931.

WILLIAM MITTELBACH.

April 2, 1856—October 13, 1930.

In the death of William Mittelbach on October 13th at Boonville, Mo., the N. A. B. P. has lost one of its original charter members, a past-president, and a staunch and loyal friend. He was a member and president of the Missouri Board of Pharmacy from 1909 to 1914. Even after his retirement from the board, however, he kept in touch with the N. A. B. P. and took an interest in its affairs. On October 5, 1922, he wrote Secretary Christensen as follows:

"I am very much pleased with the growth of our association. It is accomplishing things I didn't believe could be accomplished. To have the entire country line up, as it has on reciprocity

in such a short time, was beyond my fondest and most desired expectations. It only shows what can be done if properly supported."

Mr. Mittelbach was born in Boonville, Mo., April 2, 1856. His father was in the shoe business there for nearly fifty years. After graduating from the public schools in 1871, the son attended the state university from 1871–1873. After serving an apprenticeship under E. Roeschel, a German pharmacist, he entered the Philadelphia College of Pharmacy in 1877, graduating in 1879. He clerked in St. Louis, Mo. and Santa Fé, N. M. for about a year, after which he started in business for himself in Boonville. He was a life member of the AMERICAN PHARMACEUTICAL ASSOCIATION having joined at New Orleans in 1891, and served as its second vice-president in 1904–1905 and first vice-president in 1906–1907. In 1915, his *alma mater* conferred upon him the honorary degree of Master in Pharmacy.

His interest in civic affairs was great and he served as secretary of the Boonville Board of Education for over thirty years, also a term or two in the city council, and was city treasurer about ten years.

For 47 years, he was a member of the Missouri Pharmaceutical Association, and on the occasion of his thirty-third anniversary as treasurer of that body last July, a committee of about 20 pharmacists from all parts of the state made the trip to Boonville and presented him with a check for $500, together with a beautifully written resolution of appreciation, which he doubtlessly valued more than the money.

Thus Pharmacy mourns the loss of another of her important pioneers.

A FEW PROBLEMS IN THE EDUCATION OF A PHARMACIST.*

BY HENRY C. BIDDLE.[1]

There are many problems to-day affecting the matter of pharmaceutical education. Among these, however, we desire to consider briefly only three.

1. UNEQUAL AND INADEQUATE PREPARATION IN THE HIGH SCHOOL.

The majority of colleges of pharmacy now require a high school diploma as a condition of entrance. This presents, however, a certain element of uncertainty because of the varied training given many applicants in the lower school. Not infrequently the high school record offers a training so deficient in science or mathematics as seriously to handicap the student in his studies in the college.

At the California College of Pharmacy students, even though graduates of a high school, have been refused admission on account of their inadequate preparation. To ameliorate this condition of affairs our western college has recommended to principals and students of high schools that the training of prospective students of pharmacy should include the following subjects:

English, three years; history, one year; mathematics (algebra and plane geometry) two or two and one-half years; chemistry, one year; physics, one year, or mathematics (including trigonometry), three years; German or French, two years; Latin, two years; biology, one year.

2. THE QUESTION OF OUTSIDE ACTIVITIES—HALF-DAY VERSUS FULL-DAY DEVOTION TO STUDY.

The limitation of college work to a half-day seriously interferes with the educational development of the student. The varied arguments advanced to sup-

* Section on Education and Legislation, A. PH. A., Baltimore meeting, 1930.—No discussion.

[1] California College of Pharmacy, San Francisco.

port the part-time program fail to recognize that the limited time does not afford sufficient opportunity for study, particularly when in certain cases the remaining half-day and part of the night may be given to clerking in a drug store. The division of interests tends to develop in the student a sponge-like attitude toward education in which he attempts to absorb the work without personal mental application. He thus fails to recognize what it really means to be a student.

To justify the division of activities during college work it has been urged that the state board requires the practical training. While we fully recognize the value of this training, attention is called to the fact that this argument is inapplicable, since credit is not ordinarily allowed by a state board for both educational work and outside practice carried on simultaneously.

The solution of the problem appears to be in following the accepted procedure of an academic college, requiring full-day devotion to the educational program.

3. THE QUESTION OF PROFESSIONAL IDEALISM—THE PHARMACIST AND HIS VISION.

Some time ago a dean in addressing a group of pharmacy students raised a question as to whether the objective before the student of pharmacy was simply the making of money. A few promptly responded in the affirmative.

One of the difficulties in pharmaceutical education has been a low level of an idealism for service. Not that anyone would decry an ambition for financial success. This is an entirely legitimate outlook. Every man is entitled to a proper recompense for his activities, and one of the duties which he owes both to society and himself is to win business success—the highest success he may honestly achieve.

Pharmaceutical education increases a man's earning capacity, but it should present an idealism beyond this in the development of a man's *value as a citizen.*

Pause for a moment to consider the problem presented. For what purpose are our activities, after all? A man may say that he is successful because he is earning money, but there is no normally balanced individual who would be willing to devote his life simply to the accumulation of wealth, if such action meant a miserly attitude toward life—simply the winning of wealth and nothing more. No, it is the zest and spirit of constructive action that drives men on. Without this the accumulation of wealth alone does not satisfy.

Several years ago in a small town near San Francisco, I was talking with a commercial traveller and in a moment of confidence he said to me, "The whole object we are working for in life after all is making money; we might as well be honest about it; that is the only end we have in view." God pity the man with an ideal like that.

Pharmaceutical education has before it the duty of presenting the ideal of good citizenship through service.

One of the personalities which has left its stamp upon this generation was the outstanding character of Theodore Roosevelt—a man whose sheer love of achievement through service swept him on to success. A similar character in many ways, but less widely known, is Francis J. Heney, who a number of years ago successfully devoted his efforts to cleansing a bad political situation in San Francisco.

At this time Dr. Benjamin I. Wheeler, then President of the University of California, extended to Mr. Heney an invitation to address the student body.

In his inimitable way of introducing a speaker, President Wheeler presented Mr. Heney to the large audience by saying, "Ladies and gentlemen, we to-day are to have the pleasure of listening to a man who attended the University for a time but never graduated; he graduated," added President Wheeler, "from the larger University of life's experience."

Then Mr. Heney stepped to the front and began to speak in a voice which is naturally a trifle harsh.

"Ladies and gentlemen," he said, "It is a great pleasure for me to be here to-day. I once attended the University, I was fired—fired for fighting—and it is of great interest to me that I am to-day invited to address this vast assemblage because I am fighting."

But Mr. Heney was invited to address the student body that day not simply because he was a fighter, but because he was fighting for civic righteousness in the City of San Francisco and was graduating in his activities from the larger University of life's experience—and that after all is the achievement that counts.

Citizenship through service is particularly open to the pharmacist.

Last year a successful pharmacist in one of the smaller towns of Southern California was named by a representative newspaper as a citizen especially worthy of mention, because of the outstanding courteous service which he was rendering the community in which he lived.

Across the bay from San Francisco are the progressive cities of Alameda, Oakland and Berkeley—the last being the site of the University of California. The position of mayor in two of these cities—Alameda and Berkeley—is to-day held by a member of the profession of pharmacy and in each case the position was awarded the incumbent because of his service value to the municipality.

One of the great responsibilities, indeed, resting upon present-day pharmaceutical education is stressing the vision of professional idealism in the higher fields of service.

DR. KARL LANDSTEINER WINS NOBEL PRIZE.

Dr. Karl Landsteiner, bacteriologist and pathologist on the staff of the Rockefeller Institute for Medical Research, New York, has been awarded the Nobel Prize for Medicine. Dr. Landsteiner was born in Vienna, he graduated at the University of Vienna in 1891, and was pathologist there from 1909 to 1919. He has been a member of the Rockefeller Institute for Medical Research since 1922. The prize amounts to about $48,000. The award was based on Dr. Landsteiner's research in connection with blood groups. He is known also for his research on infantile paralysis, paroxysmal hemoglobinuria and blood serum in relation to immunity. The only other American who has received the Nobel Prize for Medicine was Dr. Alexis Carrel, to whom it was awarded in 1912.

SURGEON GENERAL IRELAND REAPPOINTED.

President Hoover, on recommendation of Secretary of War Hurley, has reappointed Gen. Merritte W. Ireland, surgeon general of the Army. This is the fourth appointment of Major General Ireland as surgeon general. In determining to permit him to finish his active army service in his present office, the President made an exception to the general rule against reappointments for the heads of branches and bureaus. General Ireland will reach the retiring age, May 31st. He was first appointed surgeon general of the Army, October 30, 1918. He had previously served as chief surgeon of the American Expeditionary Forces and also as surgeon general. He was reappointed surgeon general, October 30, 1922, and again, October 30, 1926.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

The Conferences of Teachers of Pharmacy, Chemistry, Materia Medica and Pharmaceutical Economics held annually give splendid opportunities for the presentation of papers and for the discussion of subjects of interest to all teachers of Pharmacy. Unfortunately, space will not permit the printing of discussions, but all papers are printed in this section of the JOURNAL.

It has been my endeavor to group these papers whenever possible and the following papers on Botany and Pharmacognosy will be of special interest to teachers of Materia Medica.—C. B. JORDAN, *Editor*.

THE TEACHING OF BOTANY.

BY C. C. PLITT.

It goes without saying that the teacher of Botany, should be well prepared for teaching his subject. He cannot know too much of it, even if he is called upon to teach the more elementary parts of Botany to Pharmacy students. What, after all, is most important to teach such students about plants? Two things at least, either one of which can be called first and foremost, and both so closely connected that they must be taken together. One of them would be a general knowledge of the plant kingdom. He should be taught that there are four large divisions of plants, and how they are distinguished one from another. He should know, too, the subdivisions of each; that the Thallophytes are conveniently divided into five groups, two groups of which, the Algae and the Fungi, stand out conspicuously, and of which he should know the main subdivisions. He should know, too, that there are two large groups of the Bryophytes, at least three of the six groups of the Pteriodophytes, and the two groups of the Spermatophytes and their subdivisions. He should be taught that this classification is one not only for convenience, but that back of it all is the idea of greater and greater complexity in structure and development; that the Thallophytes are the lowly organized plants, many consisting of but one cell, that the Mosses are much higher, and that the Seed Plants are most highly organized. It is only a step now, to classification or taxonomy in general. Then, too, he should be taught that the plant is a living entity, and the meaning of this concept. What is meant by living? What peculiarities distinguish a living thing from the non-living? What is meant by an organism, an organ, and what by a life history? He should be taught that every living thing has a live history, the story of its development from its earliest life until it reproduces its kind. He should learn of the various ways by which plants may reproduce themselves, of sexual reproduction and of propagation.

The idea of organs leads to a study of function, and the student should learn, as far as possible, the uses of the many organs that, in countless ages, have gradually been evolved by plants.

These two things, which I claim should be taught, should stand out as a back ground and be kept constantly in mind. It is true that in teaching Pharmacy students, the fact must not be lost sight of that one of the real reasons for their study of Botany is, that they will use this knowledge in the study of Pharmacognosy. Morphology, therefore, and especially that of the highest plants must

receive most attention and there should be no especial difficulty in communicating it.

An outline of how best to present the course depends much upon whether the study is to be given in one semester or throughout the year or, as with us, it is divided, and the gross anatomy and more elementary part of vegetable histology are given at one time, and the more difficult part at another time. Right here, let me emphasize that at no time should Botany be taught the beginner by starting him off with the compound microscope. I have tried various ways and have found that much depends upon whether the course is given during the first semester or the second. For the fall course, start out at once with a complete flowering plant; point out the vegetative organs and the reproductive organs; the student should have, at least, some idea of what the thing is about. Next, take up the flower, while some may still be found; then fruits and seeds and their germination; then stems, buds and leaves. The student, having learned what is meant by a Spermatophyte or Seed Plant, can easily study a fern and its life history; then a moss and its life history and alternation of generations; and lastly, representative Thallophytes, one or more Fungi and one or more Algæ, and then be made acquainted with the compound microscope. Knowing now, that there are plants consisting of one cell, some of rows of cells, etc., etc., the time has come to study a typical plant cell—that all plants are built up of cells, that these form tissues and are variously constructed and arranged in our higher plants.

If the course is given in the second semester—start with fruits and seeds, and bring in flowers last. Spring, with its many flowers, is the ideal time to study Taxonomy.

The course in Vegetable Histology should follow this preliminary course. Begin with the plant cell; onion epidermis is ideal for this purpose. It is easily obtained; it can be used, too, as material, when the student makes his first permanently mounted slide. Next, the tissues, parenchyma, collenchyma and sclerenchyma are studied and then epidermal tissue with its stomata and trichomes. Parenchyma, as storage tissue, follows, with the starches, aleurone grains, crystals, secretory ducts, mucilage sacs, intercellular air spaces, milk tissue, etc., etc. Next take up wood fibres, bast fibres, tracheids, vessels and then the various fibrovascular bundles. At some time during this part of the course the student is instructed how to calibrate the eyepiece micrometer, and he measures a number of starch grains and other microscopic objects; next, the arrangements of the tissues and fibrovascular bundles in the several plant organs, especially in stems, rhizomes, roots and leaves of the higher plants is taken up.

Vegetable histology, naturally, leads to the study of vegetable powders, and the remainder of the course can be given over to the study of a number of representative powders.

THE TEACHING OF PHARMACOGNOSY.

BY F. J. BACON.

The Section on Materia Medica, during the past few years, has heard papers on the teaching of Pharmacodynamics, Physiology, Toxicology, Bioassays and Bacteriology. This year papers on the teaching of other subjects under the general

head of Materia Medica will be presented. With the four-year course in the near future a rearrangement of our courses will be necessary to properly balance the content of a four-year curriculum.

The purpose of these reports, in my opinion, is to standardize to a certain extent the courses in pharmacy. I do not think that it would be desirable to make all Pharmacy Schools uniform in their course work, even if it were possible, but a certain amount of time must be spent on the several branches of Materia Medica in order to give the student a broad general education for all branches of Pharmacy.

The Charters' Survey divides the course in Pharmacy into three main heads: Pharmacy, Chemistry and Materia Medica. Under Materia Medica the following heads are listed: Bacteriology, Biologic Assaying, Botany, Glands and Gland Therapy, Insecticides, Pharmacognosy, Pharmacology, Physiology, Posology, Public Health and Toxicology.

The term, Materia Medica, includes the above subjects and is treated as a division of Pharmacy. It is evident that this field is the most diversified of any branch of Pharmacy. A study of the graphs presented by C. O. Lee and H. G. DeKay before the American Association of Colleges of Pharmacy last year shows that the three major divisions of Pharmacy, Chemistry and Materia Medica were given in all schools surveyed, but there were wide variations in the amount of time devoted to each subject. In presenting a paper on Pharmacognosy, I will discuss the subjects which are generally considered under this head.

As botany is a prerequisite to pharmacognosy the nature of the Botany course offered to pharmacy students should be carefully considered. General Botany as it is taught in our liberal arts colleges of to-day confines itself largely to a study of fundamental botanical principles. Pharmacy students as well as students of other schools should be given in their first courses sound, working, fundamental courses which may serve as a basis as they proceed in their specialized study. There are many suitable texts on Botany which may be used to augment a well-organized laboratory course. In general the course covers the following heads: The make-up of a plant; structure and function of cells, roots, stems, buds and leaves; the manufacture and utilization of foods, and a survey of the plant kingdom. The last part of the course may be devoted to field trips to study the taxonomy of plants and to apply the theories of botany in the field. A course as outlined will require about five hours a week for the school year.

General Botany is followed in the second year by Pharmacognosy. At Western Reserve six hours a week are allotted to the course, three being spent in recitation or lecture and three hours in the laboratory. In discussing the U. S. P. and N. F. drugs we follow a system devised by Dr. W. O. Richtmann at the University of

1. Official Latin Title
2. Official English Title
3. Abbreviation
4. Synonyms
5. Scientific Name
6. Part Used
7. Habitat
8. Impurity
9. Ash
10. Assay
11. Preservation
12. Description
    (*a*) shape; (*b*) size; (*c*) fracture; (*d*) color; (*e*) odor; (*f*) taste
13. Constituents
14. Medicinal Properties
15. Dose
16. Preparations

Wisconsin. The drugs are arranged in a botanical classification after the Syllabus of Engler and Gilg, and studied under the heads given in the foregoing.

The student fills in a sheet for each official drug. The habitat, constituents and properties are supplied and discussed by the instructor, the balance of the information necessary to complete the sheet can be found in the U. S. P. or the N. F. Lantern slides, maps, authentic specimens and adulterants are used to familiarize the student with the drugs, and to build up an interest in pharmacognosy. The laboratory work consists of a macroscopic and microscopic study of the more important drugs. Laboratory sheets are issued to the student directing work on the gross structure, internal structure, micro-chemical tests and indentification of powdered drugs. Special attention is given in this course to the definition and application of the terms used in the description of crude and powdered drugs, to enable the student to read intelligently the U. S. P. or N. F. monograph of a drug. Work in identification of drugs is carried on by means of a cabinet which contains an unlabeled sample of each drug considered. The samples are, however, numbered and a key sheet is available to the students for study. From time to time a written or oral quiz is given to cover an assigned number of drugs, and at the close of the semester the student is required to identify all of the drug samples.

The general course in Pharmacognosy is followed by an advanced course in Microscopy. In this course a more detailed study of the plant cell, non-protoplasmic cell contents, plant tissues and micro-chemical tests are carried out. The course consists chiefly of laboratory work on powdered drugs and their adulterants, but some attention is given to commercial fibres, starches and food products.

Medicinal Plant Gardens are an important phase of the Department of Pharmacognosy.

Work on the cultivation of medicinal plants is carried on at present in a general way by colleges of pharmacy. The garden serves as a source of authentic material for research problems and also offers a commercial supply of certain drugs for laboratory and hospital use. Practical experience in the cultivation of plants can be offered in this way to the student.

A student desiring to major in Pharmacognosy and to continue with graduate work should select courses in the following related subjects: Advanced Botany, Histology, Taxonomy, Plant Physiology, Genetics and the cultivation of medicinal plants.

U. S. CIVIL SERVICE EXAMINATION FOR SENIOR TOXICOLOGIST.

Applications for admission to the examination for Senior Toxicologist must be filed with the U. S. Civil Service Commission at Washington, D. C., not later than November 26th. The entrance salary for this position in Washington, D. C., is $4600 a year; if appointment is made to the Field Service the entrance salary may be at any rate within the salary range of $4600 to $5400 a year, varying with conditions obtaining at the headquarters where the vacancy exists.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C.

Doctors and surgeons found guilty of carelessness or inexperience causing the death of a patient will be classed as criminals and subjected to punishment, under the terms of amendments to the penal code of Mexico, now being drawn up.

ALEXANDER NICOLAUS SCHERER.*

BY EDWARD KREMERS.

Scherer may in a sense be referred to as the father of modern pharmacy in Russia. In 1822 he published the first and, so far, the only catalog of pharmacopœial literature. Yet most of our pharmaceutical historians do not seem to be aware that such a man existed. Thus the index to "Schelenz's Geschichte der Pharmazie," with its twenty-five thousand primes, contains but one page reference to the subject of this sketch. Upon looking it up we find that in "1818 weihte der in Deutschland gebildete Staatsrat Scherer in Petersburg die 'pharmazeutische Gesellschaft' ein..." (1) and gives as references *Repertor*, 8, 373; 21, 147. Although Frederking's "Fundamentals" is a much smaller treatise, we find at least a short paragraph devoted to the man under consideration (2). The explanation for this may, no doubt, be found in the fact that Frederking lived in Russia and was an honorary member of the pharmaceutical society of St. Petersburg founded by Scherer. Ludwig refers to him as the translator of an article by Parmentier and Deyeux (3) and as editor of three chemical publications (4). Given such scant treatment by German authors, one will not be surprised that pharmaceutical historians writing in English, such as Wootton and LaWall, do not even mention his name. As already stated, in 1822, he published a *Literatura pharmacopœarum collecta* which served as final volume to the *Codex medicamentarius Europæus*. True, his compilation is but a catalog and not a history of pharmacopœias. Yet, if we recall that even to-day we have no real history of pharmacopœial literature, the mere compilation of a catalog of the numerous editions of pharmacopœias and their commentaries seems to deserve more recognition than has been accorded its editor in modern treatises that call themselves histories of pharmacy. Even Schelenz makes no mention of this compilation which, in a way, is more valuable to the student of pharmacopœial literature than his numerous detached references on the subject arranged according to centuries. Poggendorff in his *Biographisch-Literarisches Handwœrterbuch der Exacten Wissenschaften* accords Scherer more space and the *Allgemeine Deutsche Biographie* devotes two and one-half pages to him. We have here another illustration of the dire want of building stones to be hewn before the structure to be known as history of pharmacy can be reared.

Alexander Nicolaus (5) was born December 30, 1771 (old style) in St. Petersburg where his father, an Alsatian (6) and Doctor of Laws, was an official. His mother came from Riga (7). The father having deserted the family, the boy lived under strained circumstances until, at the age of twelve, a well-to-do brother of his mother took him into his home. At the age of eighteen, he left the "Domschule" in Riga to study theology in Jena (8). However, he soon turned to the natural sciences, particularly chemistry, in spite of the fact that the family support was withdrawn because of the change. He attracted the attention of Goettling (9) and Voigt (10). The latter recommended him to the Grandduke of Sachsen-Weimar (11) for support. In 1794 he attained the degree of Doctor of Philosophy. He took part in the organization of the Natural Science Society and decided to devote himself to an academic career. His lectures at Jena brought him into con-

* Section on Historical Pharmacy, Baltimore meeting, 1930.

flict with his former teachers and he was induced to leave. Supported by a liberal stipend from the Grandduke, he went to England and Scotland to study chemistry and chemical technology. In 1799 he returned to Weimar and was given the title of "Bergrath" (12). Here also he delivered lectures on experimental chemistry.

Having become well known through his publications, he was appointed Professor of Physics at the University at Halle in 1800. However, the academic life did not suit him and he accepted a position as chemical director of the fayence factory of Baron v. Eckartstein near Potsdam. But this also did not suit him for in 1803 he accepted a call to Dorpat (13), as successor to the late Professor of Chemistry and Pharmacy (14). A year later he left again to accept a like position at the Medico-chirurgical Academy at St. Petersburg where he found a wide field for his activities. Soon he was made a member of the Academy of Science. He also occupied several administrative offices. He was given the title of nobility, hence von Scherer.

It was here that he rendered conspicuous services to Russian pharmacy. A pharmaceutical school having been organized in 1817, on December 24, 1818, the organization of the Pharmaceutical Society was officially celebrated (1). His personality, however, was such that he made many enemies. In consequence he suffered unpleasantness and set backs in his later years. He died in St. Petersburg October 16, 1824 (old style) (28th new style?) leaving a widow and three children.

His name is associated with numerous publications. Among these his journalistic enterprises may receive special mention:

Allgemeines Journal der Chemie, 10 vols., 1798–1803 (Berlin).
Archiv fuer d. theoret. Chemie, 4 fascicles, 1800–1802 (Jena).
Nordische Blaetter fuer d. Chemie, 4 fascicles, 1817–1818 (Halle).
Allgem. nordische Annal. d. Chemie u. s. w., 8 vols., St. Petersburg 1819–1822.

The introduction of Lavoisier's antiphlogistic theories in Germany and Russia, also the popularization of chemistry, which at that time was attracting special attention, afforded him abundant opportunities for his energy.

Though educated primarily as a chemist, pharmacy appears to have attracted his attention at an early date as evidenced by his contribution "Ueber die Maengel der Pharmacie" in the *Berlinisches Jahrbuch der Pharmacie* for 1927. On the other hand his interest in Russian pharmacy may have been due to the fact that he found more chemically minded apothecaries than professional chemists.

The reason why Kopp barely mentions Scherer in his four volume *Geschichte der Chemie* may find an explanation in the summary of his life-work as recorded by his biographer in the *Neuer Nekrolog der Deutschen* and quoted in the *Allgem. Deutsche Biographie:*

"Er hat viel erlernt, weniger ergruendet, weil es ihm an Staetigkeit und Beharrlichkeit fehlte; er hat das hœchste Ziel seiner Wissenschaft gekannt und vor Augen gehabt, aber sich ihm nie gænzlich genæhert, weil ihn so vieles reizte und auf Abwege fuehrte, er hat viel gearbeitet, gekæmpft, mit Stuermungen und Brandungen gerungen, ist aber eigentlich nie in den Hafen eingelaufen und erst mit seinem Tode zur Ruhe gekommen."

The biographical notes in Poggendorff are based on:

(1) J. F. v. Recke und K. E. Napiersky, *Allgemeines Schriftsteller und Gelehrten-Lexikon der Provinzen Liv-, Esth-u. Curland*, 1827–1832.

(2) B. F. Voigt, *Neuer Nekrolog d. Deutschen. Jahrg.*, 1823–1852. (Publ. 1825–1854.)

(1) *Geschichte der Pharmazie*, page 652.

(2) *Grundzuege der Geschichte der Pharmacie*, page 184.

(3) Phillippe-Ludwig, *Geschichte der Apotheker*, page 756.

(4) *Ibid.*, page 872.

(5) Presumably the given names are an expression of the loyalty on the part of the parents for the country of their adoption, for both are common in the czarist family of Russia.

(6) The author of his biography in the *Allgemeine Deutsche Biographie* refers to his father, neither as German nor French, but as Alsatian. His father was German, as his name clearly indicates, but Alsace was at the time a part of France.

(7) The biographies consulted do not give the mother's maiden name, but since there were many Germans in Riga and other cities of the Baltic provinces, she also may have been German though politically a Russian, Livland belonging to Russia at the time of Scherer's birth.

(8) That the mother's family was German in sentiment is revealed by the fact that her brother sent his nephew to a German university. The French inclinations of the Alsatian father are indicated by his appearance in Paris after having deserted wife and children. (*Allgem. Deutsch Biogr.*)

(9) J. F. A. Goettling, after an apprenticeship under Wiegleb in Langensalza, came to Bucholz in Weimar, where, through Goethe's influence, he was afforded the means by the Duke Karl August of Weimar, to study in Goettingen. Later, through the same influence, he was made professor at Jena. (Schelenz, *Geschichte*, page 600.)

(10) All that the histories of pharmacy tell us about J. H. Voigt is that he was connected with Jena (Phillippe-Ludwig, page 880) and that he edited the *Magazin fuer den neusten Zustand der Naturkunde* from 1797 to 1806 (*Ibid.*, page 871).

(11) Karl August (1758–1828) well known as the life-long friend of Goethe. It was through the latter's influence that Doebereiner, a pharmacist, was appointed Professor of Chemistry at Jena.

(12) Goethe had come to Weimar late in 1775. He became interested in the mines of Ilmenau and through his mineralogical activities in the sciences generally. Becoming more and more involved in the business of government of the small Thuringian state, he no doubt sought partial relief in turning over his duties, so far as the mines were concerned, to some one else.

(13) The present university was organized in 1801, though it traces its interrupted history back as far as the gymnasium established by Gustavus Adolphus in 1630. It was practically a German university until its russification began about the middle of the eighties of the past century. Here Draggendorff and Kobert taught. During the winter semester 1893 there were 1348 students of which number 198 were pharmacists. The former "Nordic Heidelberg" became Jurjew of the Russians, now of the Livlanders.

(14) A Dr. Arzt of Saxony, who died very shortly after having assumed his position as teacher.

LIMITED DEMAND FOR SICILIAN WHITE SQUILL.

While the existence of a genuine red squill in the Palermo region of Sicily is reported, dealers assert that what is called red squill is actually only a second and discolored quality of white squill. Authorities in Palermo on Sicilian products deny this, however, saying that there are two distinct varieties, of which only the white has heretofore been gathered and used. Therefore, it is believed that it is this discoloration which has led some dealers to suppose that they are dealing in red squill, which acquires its color from the nature of the soil in which it grows. The supply is almost unlimited, but the demand limits the actual harvest to between 100 and 150 tons. It is believed that this is entirely white squill. The principal growing regions are Sutera, Campofranco and Naro, all in the Province of Agrigento; Villafrati and Bosco Godrano, in the Province of Palermo; and Palagonia, in the Province of Catania. All squill grows wild, usually on otherwise useless public lands, and the right to gather it is farmed out by municipalities concerned, for a small consideration. White squill and red are said to grow in the same regions. A list of dealers in white squill at Palermo is available upon application. (Vice-Consul Walton C. Ferris, Palermo.)

MIAMI PREPARING FOR THE A. PH. A. CONVENTION.

BY H. C. CHRISTENSEN, PRESIDENT A. PH. A.

While on a southern trip the latter part of July and early in August, I decided to take advantage of the opportunity to find out just what Miami has to offer as a convention city. As everyone knows by this time, the AMERICAN PHARMACEUTICAL ASSOCIATION will hold its seventy-ninth annual convention in Miami, Florida, the week of July 27, 1931—Columbus Hotel, headquarters. Some of the letters received from members express the fear that the weather is excessively hot there during the month of July. Because of this, I will discuss the weather first.

THE WEATHER.

Upon my arrival in Miami, I found the weather cooler than in Chicago when I left there The sun is hot in Miami as it is elsewhere, but cool ocean breezes usually prevail during the summer months, especially during the month of July. These have a moderating effect so that the heat is seldom excessive. The shady side of the street is always comfortable, as are also the hotel lobbies, even during mid-day. There is always more or less of a cool breeze during the night.

Columbus Hotel, Miama—Headquarters A. PH. A. meeting.

In order to make certain that I had not struck a few days of "unusual" weather, I delved into the temperature statistics. I found the average number of days per year with a temperature of 90 degrees or over compiled from Government weather reports, as follows: Miami 4; Boston 9; Chicago 11; Indianapolis 18; Des Moines 21; St. Louis 24. Thus it will be seen that Boston has more than twice as many very hot days as Miami, Chicago almost three times, Indianapolis more than four, Des Moines more than five and St. Louis exactly six times as many. The mean high and low temperatures for July 1929 in Miami were as follows: High 86; low 74. During the month of July, the weather conditions are more settled than in late August and in September, when the heat and humidity are greater. For that reason, the last week in July was chosen as the convention date. This particular time of the month also gives visitors an opportunity to see the tropical beauty under a full moon. Also, there is ample time for a vacation trip before the college season opens.

I would remind those who are worrying about Miami weather of the St. Louis and Baltimore conventions. A number of our people remained away from the St. Louis meeting anticipating excessive heat. What actually happened was that the cold caused almost everyone to leave the outdoor municipal opera before the performance was half over, notwithstanding extra blankets and overcoats. Weather is often a matter of breaks. Baltimore in May was unusually hot this year. A southern city may be comparatively cool and a northern point hot. Therefore, let me urge members not to decide in advance how hot the weather will be. Bear in mind that no point in Florida is in excess of 80 miles from the Atlantic and Gulf shores, with prevailing breezes to maintain a delightful temperature. Statistics show that Miami has the lowest maximum temperature of any city in the United States.

THE LOCAL COMMITTEE.

Both the committee as a whole and its individual members have proven themselves to be fast workers. This show of activity a full year in advance of the date fixed for the convention

is proof positive to me that those who attend the convention, as well as guests, may look forward to a very busy and interesting time.

The morning of my arrival in Miami, Chairman Clemmer called a meeting of the committee for ten o'clock and every member was present at the appointed hour. Preliminary plans for the convention period were gone over. Dr. J. H. Beal, now a resident of Florida, had previously met with the committee and rendered valuable aid in outlining a preliminary plan of program and giving helpful suggestions for approaching problems confronting the committee. Through his influence, the state association was induced to change plans previously made for its convention, so that the same will be held in Miami concurrent with the A. PH. A. meetings. Incidentally, the Local Committee arranged for me to address Florida pharmacists over the radio one of the evenings while there, urging them to lend their support and coöperation to making the 1931 meeting a success.

The committee held several meetings while I was there. Between sessions, I was taken on tours of inspection by automobile and shown the "Magic City," its ocean drives and boulevards, Coral Gables, the beaches and the many facilities for entertaining guests.

Even at this early date, the entertainment features of the program are well advanced, except for the working out of final details. There will be special entertainment for the ladies; surf and pool bathing with a program of water sports by experts at Miami Beach; an entire evening of entertainment and dancing at the wonderful new pier just being completed there. Also, street dancing by moonlight under the palms; trips in glass bottom boats out to the Coral Reefs and Marine Gardens with gorgeous under water views; another trip up the Miami River to the Everglades, and a visit to the Seminole Indian villages, seeing the alligator farms and tropical wild life en route. The Royal Palm State Park, wildly beautiful, containing natural growth of Royal Palms and tropical flora growing nowhere else on the continent. Also a trip to Dr. Petersen's "Bolilta Grove" where he has over 7000 tropical fruit bearing and other plants, imported from all over the world—the largest variety and assortment of rare plants, shrubs and trees in the United States, which should prove interesting to our botanists. But I have forgotten to mention the many automobile drives and sightseeing trips to Coral Gables, Miami Beach, and the surrounding country—also banquets, etc.

The business sessions of the convention will be the outstanding feature, but it is too early now to make any announcements with regard to the business program. Every pharmacist who attends will find himself well repaid. In this age of corporations and mergers, individuals must unite as a group if their efforts are to be successful.

A VACATION IN FLORIDA AND CUBA.

For those who are planning a vacation either before or after the convention, there are many suggestions. To the golfer, Miami offers many splendid courses, easily accessible. Tennis, swimming, pool and surf bathing, fishing, cruises to the Island Kingdam—all these will assure a good time. For motor enthusiasts, there are splendid roads through ever-changing tropical scenery (Chairman Clemmer drove me from Daytona to Miami—I speak from personal experience).

Arrangements are being made by the Committee for a trip to Havana, Cuba, leaving Miami by train on the Saturday morning, after the close of the convention at 7:15 A.M., and arriving in Key West *via* the Over Seas Railroad about four hours later, thence by ship to Havana, arriving in the late afternoon. The Cuban Pharmaceutical Association will greet the members of the AMERICAN PHARMACEUTICAL ASSOCIATION and is planning a banquet and entertainment in its honor.

Sunday, Monday and Tuesday will be devoted to sightseeing, including Moro Castle, Cabana Fortress, Tropical Gardens and old Havana, where foreign atmosphere and antiquity predominate.

The entire cost of the trip, Miami to Havana and return, including railroad fare, steamship fare, and meals en route, and hotel expense will be about $75.00. Very considerately, the meals while in Cuba have not been included as the committee anticipates that the visitors will only have to buy their breakfasts as special invitations and banquets will provide for the rest.

The party will return to Florida on Wednesday. A special program will be planned by the committee for those who remain in Florida and do not take the Cuban trip.

TRANSPORTATION.

The opportunities of making a delightful vacation out of the journey to Miami, either going or returning, are also many.

For those living in the Middle West and the East, a long rail trip can be avoided by making connection with coastwise steamers at either New York or Baltimore. Special parties will be organized.

The Pacific Coast members have the opportunity of making the entire trip by water, going through the Panama Canal. Here too arrangements can be made in advance for a group.

The busy people who must leave at the latest possible moment and arrive in the shortest time will, of course, in the majority of cases travel by rail. Fast through trains and through car service from the North and the West connecting with and operated over the Florida East Coast Railway direct to Miami provide the shortest and most direct route. Skirting as it does the scenic shores of East Florida between Jacksonville and Miami, it passes through many points of interest—historic St. Augustine, Ormond, Daytona Beach, along the beautiful Indian River, and through the magnificent Palm Beaches.

Round trip tickets to Miami routed *via* Seaboard Air Line Railway will also be made available and will be optional *via* Tampa or St. Petersburg or both without additional charge. This

Bay Front Hotels in Miami, where the AMERICAN PHARMACEUTICAL ASSOCIATION Meets, 1931.

will give opportunity to take a post-convention or pre-convention tour *via* regular daily trains to the West Coast, and if desired, stopping off at West Lake Wales to visit Bok's famous tower without extra charge. These tickets are also honored on bus between West Lake Wales and St. Petersburg affording the opportunity of a three and one-half hour sightseeing trip through a most beautiful section of Florida.

Motorists will find hundreds of miles of well-paved roads in Florida through tropical jungles and along the shores of the ocean and banks of the rivers to make the trip interesting.

Detailed information will be given later with regard to reduced railroad fares, and other final convention information.

HOTELS.

The headquarters hotel—the Columbus—is modern in every respect, built to provide every comfort for its guests and those attending the business sessions. A spacious lobby on the second floor of the building with a comfortable veranda will be an ideal place for congregating. An open air meeting room is also available.

The Columbus is surrounded by three other good hotels, within a block or two; within not more than three blocks are six hotels. There is no doubt, therefore, that the hotel facilities are more than ample. This is one of the most beautiful sections of Miami with its Bay Front

boulevard and Bay Front park skirting the shores of Bay Biscayne. The business section is several blocks distant, an easy walk, far enough away to be out of city noises and distractions.

The McAllister Hotel adjoins the Columbus, separated only by an arcade. The Leamington Hotel opposite the Columbus and the Watson a short block away provide possibly less luxurious but very comfortable and modern accommodations at a lower price. Arrangements are being made for special rates at all of these hotels, which will be announced later.

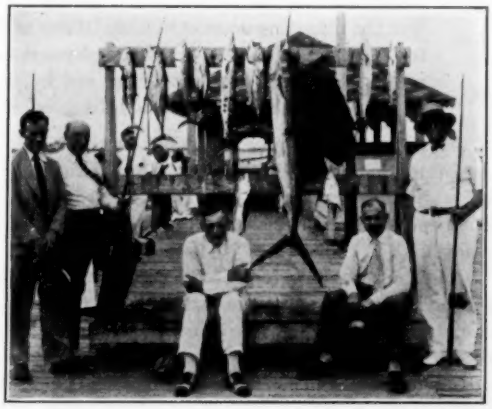
DEEP SEA FISHING.

To accomplish the full purpose of this article, I must pass along the glad tidings to those of the pharmaceutical tribe who, like myself, enjoy piscatorial sport, that here off the shores of Miami is a fisherman's paradise. The Local Committee will see to it that anyone's desires in that direction are gratified. I speak from personal experience.

On the last day of my stay in Miami, the Committee gave me a happy surprise by inviting me to accompany four of its members on a deep-sea fishing trip. Our party consisted of Chairman John K. Clemmer; Local Secretary, G. H. Grommet; A. Finstead; Wm. Fossett; Captain Joe, a general utility man; and yours truly. Mr. Finstead, with the natural intuition, instinct or whatever it is, of his Norse forbears, selected a boat from the Miami Charter fishing fleet—Inwood, the Second. The Miami Charter fishing fleet, by the way, is reputed to be the largest in the U. S.

We spent the day surface-fishing in the Gulf Stream, most of the time ten or fifteen miles from shore. We intended to come in closer to shore toward evening for bottom fishing but a storm—a typical, tropical squall of comparatively short duration—caused us to change our plans.

There were thrills aplenty. Our catch consisted of one sailfish, fully six feet in length, caught by Secretary Grommet, and a goodly number of barracuda and bonita ranging in weight from 10 to 30 lbs.



Left to right—W. E. Fossett, President H. C. Christensen, A. Finstad, Local Secretary G. H. Grommet, John Clemmer. Above, on the right of the Local Secretary is the head of a fish as evidence that President Christensen caught it, but a shark left him only the head.

A lack of space and the insufficiency of words prevent my giving a description of the almost constant thrills and excitement of such a day of sport. I do, however, want to relate one unique experience. I hooked a bonita which, judging from the fight he put up under severe handicap, must have weighed thirty or forty pounds. After a hard and thrilling half hour of maneuvering, I succeeded in bringing him to within twenty-five or thirty yards of the boat. However, at that point, Mr. Fish again took command, and in spite of anything I could do, made a run straight out for about 150 yards. Then, all of a sudden, there was a slackened line. I started to reel in, feeling certain that I had lost my fish. Imagine my surprise, when I reeled up close, at finding that only the head of the fish remained on the hook. Evidently when the fish made his last desperate attempt at freedom, he was being pursued by a shark that overtook him and left only the head.

While this is a true fish story, I am not unmindful of the hesitancy with which it may be received. I can't prove it by "Bill Jones" but I can prove it by the three members of the committee who were with me, and whose reputation for veracity is unquestionable. Also, a picture of not only the fishermen but the head of the fish.

There are many other varieties of fish besides those we caught in these waters. The experts and even the novices can try their luck with a good measure of success. These include the marlin tarpon, dolphin, amber jack, etc. However, I want to state now and here that the pursuit and landing of some of the individuals of the finny tribes here named can hardly be called "the gentle art of Izaak Walton."

PHARMACY WEEK REPORT.

BY ROBERT J. RUTH, NATIONAL CHAIRMAN.

Remarkable in scope and attention-compelling interest and entirely devoid of any tinge of commercialism to detract from its effectiveness, the sixth annual observance of National Pharmacy Week will go down in pharmaceutical history as a mighty accomplishment, the consummation of which is a tribute to organized effort—in this instance to the pharmacists of the nation who united with all qualifying allied agencies to carry the story of professional pharmacy and pharmaceutical service to an appreciative public which is each year becoming better acquainted with and interested in the pharmacist, his problems and status.

A message from President Hoover to the pharmacists of the nation gave fitting official recognition to the Pharmacy Week observance which is and always must be directly in the interest of the public health. President Hoover's message is as follows:

> "On the development of drugs and their uses depend to a considerable degree the health and the welfare of the people of the world. Daily our laboratories are engaged in the pursuit of newer knowledge which will make constantly more effective the unending combat against illness and disease. The pharmacists of our country are indispensable allies of the physicians. It is fitting, therefore, that each year we should formally acknowledge our indebtedness to them. I am glad to extend to the pharmacists of the nation the good wishes of all our people."

Arthur W. Hyde, Secretary of the U. S. Department of Agriculture and Julius Klein, Assistant Secretary of the U. S. Department of Commerce contributed to the governmental recognition given the importance of Pharmacy Week by their special messages for the occasion. Such coöperation is very cheering to pharmacists and those connected with or interested in Pharmacy.

The radio program broadcast from more than a hundred stations and reaching 80,000,000 people in the United States and Canada, the many thousands of noteworthy professional window displays in pharmacies, the hundreds of public addresses made by pharmacists in every part of the country and the flood of newspaper spreads, news stories and editorials which occupied hundreds of thousands of priceless inches of "white space" in the press of the nation and which gave Pharmacy Week a truly Coast-to-Coast coverage, were an indication of the extraordinary interest which the movement commands and its astounding growth since the first observance only five years ago, in 1925.

Just as impressive was the Canadian observance of Pharmacy Week, which is so closely linked with that of the United States because of the constant contact which the National Executive Committee on Pharmacy Week enjoys with the Canadian Pharmaceutical Association and through this great representative pharmaceutical body in the Dominion this contact is carried to our brother pharmacisits who comprise the membership of the various provincial associations in our friendly sister nation.

This laudable Pharmacy Week movement which has spread around the world, first from the United States and Canada to England, South Africa, Australia, New Zealand and Tasmania—all of the English-speaking countries and now to several lands where the English tongue is not spoken—has accomplished something of importance for which purpose it was not originally launched. Pharmacy Week has rekindled the love of professional pharmacy in the hearts of thousands of pharmacists who were, perhaps, not aware that their pharmacies were rapidly losing professional appearance, prestige and practice. Pharmacy Week is helping to bring the colored show bottles—ancient symbols of the profession—back to the pharmacies of the nation.

In his splendid Pharmacy Week proclamation, President H. C. Christensen, of the AMERICAN PHARMACEUTICAL ASSOCIATION said: "The professional side of Pharmacy is the one and only part of the business responsible for the legal recognition given the pharmacist under state pharmacy laws; it is the only excuse for his existence." That the pharmacists of this country realize the truth and wisdom of these words is evidenced by their active and whole-hearted support of the sixth annual observance of Pharmacy Week.

It cannot be doubted that the public has been impressed by the importance of the practice of pharmacy and by the fact that the services of the pharmacist are indispensable in any commu-

nity. Pharmacy Week has set up a new standard for the pharmacist in the public mind which the public will expect him to live up to. This will be a helpful influence and the pharmacist will not violate this public confidence but will strive as never before to deserve the public trust.

To President Hoover, U. S. Senator Royal S. Copeland, Secretary Hyde and Assistant-Secretary Klein, to the officers and members of the national, state and local pharmaceutical associations, retail pharmacists, wholesalers and manufacturers, the publishers, editors and members of the staffs of all journals of pharmacy, the many newspapers and radio stations, the officers, deans and faculty members of the colleges of pharmacy and all others who contributed so generously to the success of Pharmacy Week, the members of the National Executive Committee on Pharmacy Week extend their deepest appreciation and take this opportunity to ask for continued coöperation and support of the seventh annual observance of Pharmacy Week, October 11–17, 1931.

NATIONAL DRUG TRADE CONFERENCE.

The Executive Committee of the National Drug Trade Conference met on November 5th, in Baltimore. A program of discussions for the meeting of the Conference was prepared. The annual meeting will be held in Washington, December 10th.

NEWS BULLETINS OF THE DRUG TRADE BUREAU OF PUBLIC INFORMATION.

Director Robert P. Fischelis, has issued further bulletins of the Drug Trade Bureau of Public Information.

Bulletin No. 38 refers to the use of Daphnia for experimental purposes in the standardization and study of drugs, by Dr. Arnold Viehoever; No. 39 relates to the Leadbeater pharmacy in Alexandria, Va., carried on by a grandson of the founder, two great, great, grandsons; a great, great, great, grandson; and a great, great, great, grand-daughter. In the list of those of the family who in successive generations were interested in this pharmacy is the late Richard H. Stabler, a former president of the A. PH. A. A brief article relating to this pharmacy will be found elsewhere in this issue of the JOURNAL; No. 40 relates to an address before the N. W. D. A. by Prof H. F. Ostlund, of the University of Minnesota, on wholesale drug distribution, in which he presented facts and figures refuting the charge that wholesale drug distribution is a wasteful enterprise. In the address he detailed a systematic business conduct; No. 41 discusses the article by E. A. Ruddiman, published in the JOURNAL A. PH. A. for September, page 957; No. 42 deals with the report of the Committee on Proprietary Goods made at the meeting of the National Wholesale Druggists Association on free goods deals; No. 43 brings out points of the interesting address by Dr. James H. Beal before the Wisconsin Pharmaceutical Association; No. 45 relates to "Studies on Strychnine" by Ward and Munch, published in the September and October numbers of the JOURNAL A. PH. A.; No. 46 relates to the Medicinal Plant Garden, of the University of Florida, and a paper on "Licorice Fern" published in the JOURNAL A. PH. A., by Fischer and Goodrich, beginning on page 1063.

Interesting matter sent along with the *bulletins* are papers by Dr. Robert P. Fischelis read before the N. A. R. D. Convention explaining the work and success of the Drug Trade Bureau of Public Information; the report of the Committee on the Cost of Medical Care was referred to in the *bulletins* of the Drug Trade Bureau, in the October JOURNAL; radio talks by Robert P. Fischelis, *secretary* and *chief chemist* of the New Jersey Board of Pharmacy, on "Guarding the Purity of Your Drugs;" and another by Dr. H. V. Arny, dean of the College of Pharmacy, Columbia University, on "Pharmacy's Contribution to Your Health." The latter talks were part of the program of Pharmacy Week.

AMERICAN REGISTERED PHARMACISTS ASSOCIATION.

We are indebted to Mr. Henry Colle for the data relative to the functions of the above named organization, which is now thirty years old. It is an association of employee pharmacists.

Mr. Colle states that "the fundamental responsibility of any organization of pharmacists is the consciousness of the group for the welfare of the public health and safety, and the American

Registered Pharmacists is an organization which has long recognized these principles. Its directors know that if the organization is to expand it is only by the constant education of the public to the value of the services of the trained employee professional pharmacists, as well as the trained employer professional pharmacist. The inculcation in its membership that the chief hope by which it can attain its objective is the giving of service of the highest type.

"Another objective correlated with the former is the recognition of the pharmacist as a trained professional man in the same class and on the same plane as the qualified and experienced physician and dentist. A second objective is the securing of adequate compensation for service rendered, and working conditions commensurate with the dignity of a professional man.

"The American Registered Pharmacists Association has its offices in San Francisco; headed by Fred A. Lion, an able executive director; it is governed by a National Board of Governors who are selected from the membership to formulate its policies and guidance of the Association. It has units of membership operating as local chapters in San Francisco, Oakland, Sacramento, Stockton, San Jose, Fresno, Bakersfield and a division with headquarters in Los Angeles, known as the Southern Division of the Association. In addition locals are under way in Minnesota and Washington State so that the organization is now national in scope. For thirty years the organization has labored to improve the condition affecting employee pharmacists, particularly in California. The Association credits itself with the framing of the California prerequisite bill, a law since 1928; the nine-hour law—a law on the California statute books since 1920, and other laws affecting the status of employee pharmacists. The Association is an acknowledged force to be reckoned with in the enforcement of the California pharmacy law.

"In addition to the qualification of being either a registered pharmacist, or a registered assistant pharmacist there is a rigid requirement regarding the fitness and the character of the applicant for admission. The application is passed on by the Board of Governors, and his credentials must be sponsored by responsible parties. Employers are admitted as associate members. Their dues are five dollars per year, including a subscription to the *Journal*, which the Association publishes monthly, but does not confer on them the right to vote. Regular members of the Association pay ten dollars per year if the dues are paid in advance, or a dollar per month if the dues are paid monthly.

"The Association has as its slogan, 'not solely by legislation, but also by education.' A slogan which is lived up to in that at all branch meetings a speaker, or a subject of educational interest to pharmacists is the main feature. The stand of the American Association of Colleges of Pharmacy in demanding a four-year course of student pharmacists-to-be, is in line with the times and we are confident that our association will sponsor it.

"Our *Journal* constantly urges its membership to continue their studies as pharmacists. It urges coöperation in all association affairs, whether it be in our Association or other organizations. *The American Registered Pharmacist* advocates a wage scale of $200.00 per month for Registered Licentiate Pharmacists and $165.00 per month for Registered Assistant Pharmacists. Investigations have shown that the greater number of our membership are receiving that amount and many are paid more. There is a constant emphasis to the employee pharmacist that he is a professional man, and that he conduct himself as such. The term 'drug clerk' is abhorrent to us; it smacks of subserviency. We want our membership to be anything but that. A reader may ask, 'How do employers react to the policies of the association?'—'Very favorably.'

"Speaking at the banquet of the California Pharmaceutical Association in convention at Pasadena last June, Mr. Dickinson, a former president of the California State Board of Pharmacy paid a fine tribute to the work of the American Registered Pharmacists Association. Each year the Association conducts its own convention; members and delegates attend from all parts of the State for discussion of problems that affect the employee pharmacist. At the Stockton meeting Mr. John M. Culley, now a member of the American Registered Pharmacists Association, was the speaker at the banquet which closed the convention.

"It is the belief of Association advocates that the employee pharmacist has interests distinct from those of his employer and that those interests are best served through an organization representing their aims. Not all pharmacists can become the proprietors of pharmacies, following graduation from college; the greater number cannot do so for a good many years. It is to serve this class of pharmacists who after all constitute the majority in the practice of pharmacy, that the American Registered Pharmacists Association functions, and will continue to serve."

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

CHICAGO.

The 191st meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the form of a dinner in the La Salle Hotel on Tuesday evening, October 14th, honoring President H. C. Christensen, the newly installed president of the national body and member of the Chicago Branch. There were 62 in attendance. Following the dinner congratulations were extended by the group and by several individuals. Many officers and other "high lights" of the drug organizations were present, including: Samuel C. Henry, secretary of the N. A. R. D., and president of the National Drug Trade Conference, Walter Harris, president of the C. R. D. A., Herman Holthoefer, secretary of the C. R. D. A., A. E. Ormes, editor of the C. R. D. A. News, Wm. B. Day, secretary of the Illinois Pharmaceutical Association, E. N. Gathercoal, chairman of the N. F. Revision Committee, Sam Antonow, George Haering, O. U. Sisson, F. W. Meissner and Julius Riemenschneider, president of the N. A. R. D. Several members who could not be present sent letters and telegrams congratulating President Christensen.

A quarterly meeting of the C. R. D. A. made it necessary for those belonging to that group to leave before a short history of the AMERICAN PHARMACEUTICAL ASSOCIATION was given by Dean Day:

"The AMERICAN PHARMACEUTICAL ASSOCIATION, founded in 1852 and now 78 years old, was based as a protest against the importation of drugs of poor quality and those containing adulterations. Very early it interested itself in the U. S. P., later developed the N. F., and lately has published the Recipe Book. The progress of pharmacy from all sources was summarized in the PROCEEDINGS which were published from the beginning, but which were dropped when the JOURNAL OF THE A. PH. A. was started. The YEAR BOOK is the largest work of the ASSOCIATION and is of prime importance. The A. PH. A. was of great help in formation of state societies and of the different colleges of pharmacy, and appointed a committee on the Syllabus for the use of apprentices in their study of pharmacy. It assisted in establishing the Association of Colleges of Pharmacy, a forum for pharmaceutical discussions, and many other organizations, such as, National Associaton of Boards of Pharmacy and the Pharmaceutical Research Council. The work of the A. PH. A. is growing in value and the membership is increasing. $500,000 has been pledged for a building in Washington. The site has been secured. This building is to be endowed for professional and scientific research in the practice of pharmacy in all divisions that may be investigated. Prestige depends upon scientific pharmacy, and this is not on the down grade. At present there are better and more attractive fields for the practicing pharmacist than at any previous time. The quality of drugs and medicines is better than ever; colleges are stronger and larger and better courses are offered. There will always

be a field for the professional pharmacist for he is a public necessity to supply drugs and medicines. H. C. Christensen is an able man and is capable of doing a great deal for pharmacy. He has a 15-month year, so we can expect more than 100% efficiency."

President Hynes of the Chicago Branch then introduced Prof. E. N. Gathercoal, chairman of the Revision Committee of the N. F., the handbook for and by the pharmacist.

After welcoming and extending greeting to President Christensen, Professor Gathercoal continued,

"The National Formulary is the part of the A. PH. A., looked to for advice, but there has never been a well-established basis for admission of preparations to this book. The U. S. P. Committee, through years of experience reached the conclusion that admission to that book should be based upon extent of use and therapeutic value. The problem of the N. F. Committee is based on the former which has been the basis for admission of articles into the N. F. but there has not been a great deal of work done in this respect. Twenty years ago Hallberg and Snow did some work along this line and in later years Charters and Cook have made a partial survey. Yet a lot has not been accomplished. Many galenical preparations are not extensively used. The proportion of these in the N. F. is about 25%, yet the frequence of occurrence in practice is decidedly less than that. One of the important jobs now is to establish a sound basis for admission. While the physicians are not in favor of a standard not based on therapeutic use we know that there are some preparations that are used extensively, but have not been admitted on this basis. Our standard must have the sanction of the physician and still continue in popularity with the pharmacist." Professor Gathercoal concluded his remarks by reminding the members how lucky they are to have as well-known a man as H. C. Christensen for their president, especially with the World Fair in view, and that while he is to be envied for his high office, he is certainly not to be envied for his duties.

H. C. Christensen, recently installed president, was then introduced as a matter of form, as no introduction was really necessary.

"After a tour of the United States as Secretary of the N. A. B. P. it is an agreeable change to be at a meeting with home folks, and in addition it is certainly a pleasure to have met with friends and hear of their appreciation and good will. I am in a position that I had never thought of attaining. In fact, I tried to get out of it when I was nominated. but finding that impossible, I decided to do the best that I can. The chairman mentioned that as I had not a great deal of other work to do, this office will put me to work. Permit me to straighten this out. I have been secretary of the N. A. B. P. since 1914. In spite of uphill work, quite a bit has been accomplished. Work has been centralized and it has proven a great help in pharmacy in more than one way. At the time a central office was decided upon there were but two states that required college time previous to admittance to an examination. Those states were New York and Pennsylvania and they gave two terms of less than six months each with no preliminary work necessary for admittance. From that time, 1914, to the present, there is a noticeable change. Now thirty-six states require graduation from a three-year college course before admittance, and there are but two states that require less than a high school education. In 1932 we have agreed to go on a four-year college basis. Strange, but there are some people that are still opposed to it. A letter received by me some time ago asks why I prefer a four-year course. The writer thinks that Pharmacy is not worth, it, as there seems no opportunity for one to go into business for himself. Even granting that a man does not go into business for himself, he would be amply repaid for spending four years in school, for where else can a man step out of a college course and get a job paying from $40.00 to $50.00 a week. Others contend that three or four years is too much time for the education of the pharmacist. I can't agree. I believe that the profession of Pharmacy requires as much training and education as any public health profession. The time is here when a good clerk in a drug store, besides being competent behind the prescription counter must be able to meet the educated public and the educated physician. He cannot afford to show a lack of education. So something besides professional education is needed. For the professional training, three years is enough, but in a four-year training course one will be able to get in addition, cultural subjects and also fundamentals of business training. Some colleges object to the latter, but after all we should consider

that in the establishment of a pharmacy a dual proposition is before the person, and we should train him so that he can conduct his business in the best possible way to succeed, and we cannot expect him to be a success in retail pharmacy under present conditions, unless he has some knowledge about business training, and we need four years to teach him that. Put the tincture bottles back on the shelves and put back the globes into the windows.

"The building project known as the American Institute of Pharmacy is now at the point where we are waiting for the Government to tell us to go on with the building, which when completed will be the only one in that group which is privately owned. The Government has taken all the surrounding property for its buildings, so Pharmacy should be proud of the fact that such a location has been obtained. The first thought was that, along with the offices, library and museums, we would have a research laboratory in the building but, later, it was decided to have the laboratory outside of the main building. The details are not ready for presentation, but it is a known fact that it must be endowed with sufficient money for real research work. This work is needed and we should be proud to help it along. Last January a scientific journal listed the accomplishments of several professional and occupational organizations, such as medicine and chemistry. Pharmacy was not mentioned. Why is it not in the front rank with some accomplishment to benefit the human race? We have some research in colleges of pharmacy, but we lack a systematized publicity bureau. Hundreds of thousands of dollars are spent by medical organizations, but Pharmacy has a hard time to get money for publishing its results. We have men who have made their money out of the retail drug business. Now is the time for each one in the field to convince them that they owe something to pharmacy. We haven't scratched the surface, but within the next few years pharmacy will come into its own and will have the money to place us where we should be. Pharmacy is a part of public health service and is becoming more and more so each day. We are judged by the outward appearance of a store-window, lunch, etc. If the independent pharmacist will realize that it is the professional side which makes it possible for him to merchandise: (there is a limit to the latter—no restaurants). A man trained for four years in a professional school will come out with enough professional spirit to make him realize that it is this spirit which counts. I have attended ten state meetings this past year and never before have I seen such a tendency toward the professional side. All state presidents have included in their addresses things along the professional side of pharmacy and have pointed out the need of featuring it. In Wisconsin a man who owns several stores has remodeled all of them, placing the prescription counter in plain sight, and now the stores have a professional appearance rather than the chain-store appearance which they have had for the last few years. He feels that by doing this he will elevate the opinion of the public toward the drug store to where it rightfully belongs.

"During my term of office I shall put forth all effort to interest the retailer, getting him to realize that the professional side needs his attention. More than anything else is the pharmacist's need to affiliate with local and national bodies. Together they stand for everything a pharmacist needs. From a survey of approximately 125,000 registered pharmacists in the United States in some 61,000 stores there are less than 25% who belong to any pharmaceutical organization. The least a pharmacist can do if he cannot give his time is to affiliate with organizations formed for his help."

President Christensen expressed his appreciation for the help of Mrs. Christensen, previously referred to by a member present, then thanked those present for the honor of their attendance and pledged to do his best, always keeping in mind the National Association of Retail Druggists in the field, which together with the AMERICAN PHARMACEUTICAL ASSOCIATION constitutes a big influence, but separate, neither can accomplish a great deal.

A rising of the group signified its acknowledgment of the honor conferred upon the Chicago Branch by having Mr. Christensen as the president of the national body, and brought the first meeting of the 1930–1931 season to a close.

DETROIT.

The October meeting of the Detroit Branch AMERICAN PHARMACEUTICAL ASSOCIATION was held in the Y. M. C. A. Building Thursday, October 16, 1930.

Immediately after dinner, President John E. Webster called the meeting to order and promised the members a year's program that

will make the Detroit Branch an outstanding one in 1931.

President Webster remarked he was glad to see such a full representation of Pharmacy at the first meeting. Professor Stocking and Professor Powers represented the University of Michigan; J. Ed. Richardson, president of the Board of Pharmacy; Ed. J. Meyer, the Pharmacy Board inspector; John Weisel, the Executive Committee of the M. S. P. A.; Leo J. LaCroix, the Executive Committee of the D. R. D. A., Dr. Ruddiman, Dr. Scoville, and many other outstanding individuals in pharmacy were in attendance.

The minutes of the May meeting held in Ann Arbor were read by the Secretary and approved.

Chairman J. J. Burniac, of the Membership Committee, announced eight new memberships to start the year and promised to beat his record of last year. Dr. Seltzer remarked that the Detroit Branch had accomplished two things—a secretary and a membership chairman.

President Webster presented Dr. Seltzer, who led in the discussion, "New Legislation to Better Conditions in Pharmacy." He said, "this legislation is being sought by all who have pharmacy at heart. Why not give it to them? The students have repeatedly brought their pleas before the Branch and there is no question about the pharmacist who finds himself facing an inferiority complex." A general discussion followed.

Mr. Joki of the U. of M. said it was a distinct handicap for one to open a drug store immediately upon passing the State Board. M. A. Friedlander spoke favorably of the plan and hopes to see the day when drug stores sell drugs. E. J. Meyer said he found there are more than 300 drug stores in Detroit to-day who care little or nothing about drugs but depend entirely on merchandising. J. Ed. Richardson, president of the Board, heartily endorsed the plan and held a very optimistic view for pharmacy in the future if legislation is enacted now to raise the standards and again put Michigan in the lead. Leo J. LaCroix said the pharmacist of to-day is building for the students and the future of pharmacy and to accomplish this, standards must be raised. John Weisel lent a favorable note to the plan, after which Mr. Seltzer suggested it be called "The Michigan Plan," as that is what it is intended for—to better Pharmacy in Michigan and have Michigan lead the way, as it has done so many times in the past.

President Webster asked for an expression endorsing the Michigan Plan and on motion of Professor Stocking, seconded by Mr. Burniac, the Michigan Plan was unanimously endorsed by the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION.

BERNARD A. BIALK, *Secretary.*

NEW YORK.

The October meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the College of Pharmacy, Columbia University, on Monday, the 13th; there was an attendance of 110, of which number twenty-five were present at the Get-Together Dinner preceding the meeting.

President Robert R. Gerstner presided. The secretary read the minutes of the April meeting; they were approved.

Chairman Lehman, of the Committee on Education and Legislation, stated that he had no report to make, since neither Congress nor the State Legislature was in session.

Dr. Mayer said that the Audit Committee had no outstanding bills to report.

Chairman Diner, of the Committee on Fraternal Relations, reported that the Joint Meeting of the Branch with the Academy of Pharmacy, proposed for September last had been postponed to a more favorable time in February.

The president called the attention of the Branch to the September issue of the *Rural New Yorker* in which he read that calcium chlorate, used dry and dusted on lightly, could be used to exterminate poison-ivy; he had found this method successful.

Dr. Wimmer said that any chlorate, *e. g.*, sodium or potassium, could be used for this purpose; also that 5 to 10% solutions of benzyl peroxide could be used for treating cases of poisoning by poison-ivy, since this like potassium permanganate oxidizes the readily oxidizable toxicodendric acid.

The secretary read letters from Secretary E. F. Kelly of the A. PH. A., wishing success to the Pharmacy Week meeting of the Branch.

The president read a letter from Dean Dandreau inviting the members to attend the Pharmacy Week exhibit at the St. John's College of Pharmacy. Dean Arny reported on Student Branches from the point of view of the A. PH. A. Council which is approving of the recommendations presented at the Baltimore meeting, including an unofficial approval

of the Associate Membership plan of the New York Branch.

The president inquired if there was any new business, and Mr. H. W. Ambruster introduced the following resolution:

"WHEREAS, serious charges have recently been made before the U. S. Senate Committee on Agriculture regarding non-enforcement of Standards of the U. S. Pharmacopœia by Federal officials, and

"WHEREAS, the integrity of the Pharmacopœia is the most precious possession of all Pharmacists who fulfill their obligations to the public, and to the medical profession, and

"WHEREAS, efforts to smother public discussions of this subject have come to our attention; *therefore be it*

"*Resolved*, That as free men and citizens we resent any attempt to prevent fullest discussion of any matter relating to Pharmacy, and we urge that these Senate hearings be continued until all such charges are investigated for the sole benefit of the public health, which is dependent upon us."

Upon motion of Dr. H. V. Arny duly seconded and carried, this resolution was referred to the A. PH. A. Council, without discussion.

The president read an editorial article from the *New York Times* entitled "More Than a Merchant," upon which he commented.

The president stated that Editor Herbert R. Mayes, of the *American Druggist*, had unavoidably been prevented from attending the meeting and had sent his regrets; he introduced Robert J. Ruth, the Father of Pharmacy Week, as the speaker of the evening.

Dr. Ruth began his address by speaking of the origin of Pharmacy Week, how, when he was chairman of the Section on Practical Pharmacy and Dispensing at the AMERICAN PHARMACEUTICAL ASSOCIATION, Buffalo meeting in 1924, the idea of the week was born and hence is to be considered a child of the A. PH. A. He spoke of the general conditions affecting pharmacy to show that retail pharmacists should take advantage of the opportunity afforded by Pharmacy Week, to show the public that they are more than merchants; he quoted the following passage from Dr. Christensen's message "The professional side of pharmacy is the one and only part of the business responsible for the legal recognition given the pharmacist under state pharmacy laws; it is the only excuse for his existence." He pointed out the vital necessity of the pharmacist to the health of the community and mentioned the Fort Leavenworth tragedy to show the danger of the handling of poisons by unqualified men.

Though many special weeks are no longer celebrated, Pharmacy Week, like Fire Prevention Week, which is based on an unselfish purpose, is still with us and has grown to have a multi-million dollar program within a space of six years; it has spread to all English-speaking countries. The speaker then proceeded to show, by a citation of facts and figures, how Pharmacy Week of 1930 would be a great success; for example, the Chemical Map of North America, prepared by Dr. H. V. Arny and Dr. E. L. Newcomb for the N. W. D. A., and designed for use as a background for store-windows, had been distributed by wholesalers to their customers all over the country, 28,000 having been lithographed, of which quantity 3000 were purchased by the Canadian Pharmaceutical Association; Merck & Co., Inc., had distributed 1500 three-color posters entitled "Why Uncle Sam O. K.'d the Pharmacopœia;" E. R. Squibb & Sons and other companies had also prepared newspaper mats to give out to retail druggists; the *American Druggist* had sent out lithographed reprints of the editorial which appeared in its special "Pharmacy Week Number" and which was to be reproduced as a full-page item in 28 Hearst newspapers throughout the country, and in addition they had distributed reprints of the $1000 cover of their October issue; Jerry McQuade, Editor of *Drug Topics*, as a Committee of One, had arranged through Barron Collier, Inc., for the appearance of over 5000 car cards in Metropolitan New York, and he had further made arrangements with the manufacturers of pharmaceutical and allied products for a contribution of a portion of their radio time; it was estimated that 80,000,000 people would be reached in this way; radio talks were to be given by Drs. H. V. Arny, Robert P. Fischelis, Ernest Little and Robert J. Ruth, and radio programs were being arranged by pharmaceutical organizations in different parts of the country; dinners, exhibits and public addresses before various societies had been planned everywhere; prizes would be awarded by certain state and city pharmaceutical organizations for Pharmacy Week windows.

Dr. Ruth said that correspondence regarding Pharmacy Week had reached him from India, and inquiries from Spanish countries; last year the Retail Pharmacists Union in England,

where 65% of all chemists' shops had observed Pharmacy Week, had offered handsome prizes in connection with a competition for an Essay on Pharmacy Week; mail had also been received from hospitals, physicians, schools, libraries and other sources too numerous to mention.

In conclusion Dr. Ruth read the letter obtained by the *American Druggist* and sent to the meeting by Herbert R. Mayes; this was the original letter from President Hoover. (This is printed on page 1161.)

President Gerstner opened the meeting for discussion and Drs. Lascoff and Diner rose to bear testimony to the fine work done by Dr. Ruth on behalf of Pharmacy Week.

Dr. Diner reported the death of two members of the Branch, namely, Michael Halpern and H. Keilin, and the members present rose in a moment's silent respect.

A rising vote of thanks was accorded to Dr. Ruth and the meeting adjourned.

HERBERT C. KASSNER, *Secretary.*

WESTERN NEW YORK.

The Western New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION has been organized and its officers are now listed in the Local Branch roster. The names of the officers and organization members, and by-laws are given in the August JOURNAL, pages 918–920.

THE LEADBEATER PHARMACY.

The files of the Leadbeater Pharmacy, in Alexandria, Va., are full of interest. Included in them are requests and canceled prescriptions of the great American patriot and succeeding masters of Mount Vernon.

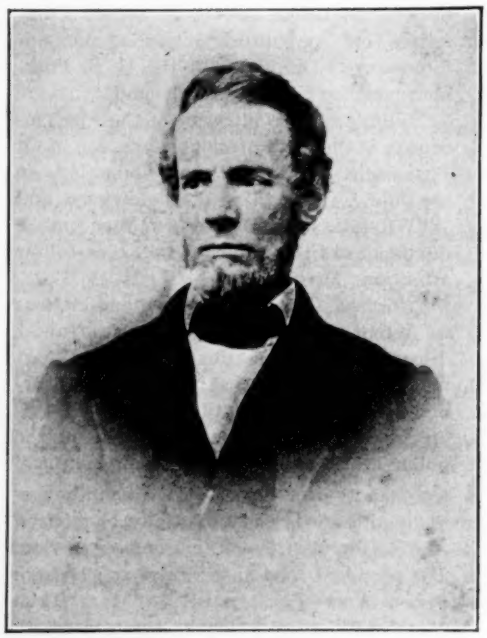
The drug store—at present an unpretentious, small brick affair not unlike the one in your neighborhood—was opened first in 1792. Edward Stabler borrowed £500 for the venture, and made a tidy sum out of it. Richard H. Stabler a descendant and an owner for a number of years was president of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1870.

Stabler's descendants, and those of John Leadbeater, who married one of his daughters in 1853, have clung to the store. Seven generations of the Washington and the Lee families have traded there.

Two Washingtons—Augustine and Lawrence—learned the drug business at Leadbeater's and later established themselves in West Virginia.

A note from Martha Washington, dated from Mount Vernon in 1802, reads:

"Mrs. Washington desires Mr. Stabler to send by bearer a quart bottle of his best castor oil and the bill for it."



RICHARD H. STABLER.

There is another from George Washington Parke Custis, one of Martha Washington's grandchildren who had been adopted by George, dated 1818:

"*My Dear Sir:* Not being able to command cash at this time from the heavy expense of my building, I inclose my note agreeable to promise. I am duly sensible of the politeness and liberality I have always received from you and I have to express my acknowledgment, also, for the very excellent articles always received from your house, and with perfect esteem for your personal character, I am, your humble servant. GEORGE W. P. CUSTIS."

Evidently the Washington family credit was good.

Judge Bushrod Washington, who inherited Mt. Vernon, wrote in 1820:

"Respected Friend: Above is a check for 77.9, amount of your account, which ought much sooner to have been attended to. In future I will thank you to send it to me at least once a year. Respectfully,—."

EDITORIAL NOTES

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Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, H. A. B. DUNNING, H. C. CHRISTENSEN, C. E. CASPARI, J. H. BEAL, W. BRUCE PHILIP, T. J. BRADLEY. *Ex-Officio Members:* H. C. CHRISTENSEN, *President;* WALTER D. ADAMS, D. B. R. JOHNSON, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* C. B. JORDAN, *Chairman of the House of Delegates.*

Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; E. N. GATHERCOAL, *Chairman,* N. F. Revision Committee; Chairmen of the Sections, A. PH. A.; E. E. SWANSON, B. V. CHRISTENSEN, RALPH E. TERRY, JOS. G. NOH, J. T. LLOYD; J. W. STURMER, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; W. M. HANKINS, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

FORTIETH ANNIVERSARY OF THE GERMAN PHARMACEUTICAL SOCIETY.

The German Pharmaceutical Society was organized November 6, 1890, and celebrated its fortieth anniversary on November 9, 1930. Commemorating the occasion Dr. Paul Siedler has dedicated a memorial volume to Prof. Dr. Hermann Thoms, one of the founders of the Society and a leader in pharmaceutical advancement. He is an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION and American pharmacists will recall his visit in this country several years ago—a sketch of the eminent scholar and pharmacist will be found in the July JOURNAL A. PH. A., 1923, page 569.

Dr. Thoms retired as head of the Pharmaceutical Institute of the University of Berlin, in 1927, after an incumbancy of twenty-five years. The German Pharmaceutical Society and University gave public recognition to his invaluable services, on which occasion the guest of honor delivered an address and after presenting this dissertation he reviewed his activities and the history of the Institute. Tributes were paid him by his students, the alumni, members of the Society and faculty and other co-workers, and a bronze tablet was placed in the Institute.

Dr. Thoms' "Handbook" on the art and science of pharmacy is the most comprehensive work on pharmacy, comprising about 4000 pages. In its preparation Dr. Thoms had the co-operation of nearly 200 leading authors in the subjects relating to pharmacy.

The Society extended invitations to the celebration of its 40th anniversary to national associations of other countries; among them the AMERICAN PHARMACEUTICAL ASSOCIATION, and responsive thereto congratulations were cabled by the ASSOCIATION.

The German Pharmaceutical Society has about 5000 members; honorary members of the United States are Dr. Edward Kremers, Dr. H. V. Arny and Editor Hugo Kantrowitz.

The principal address of the Jubilee was delivered by Prof. Dr. Walden on "Der Apotheker als Kulturträger—ein historisher Rückblick." (The Apothecary's part in Culture—an historical review.)

The Foreword of the memorial volume has been prepared under the direction of Dr. Paul Siedler in which he depicts the history of the period and development of pharmacy. He speaks of the achievement of pharmacists and dwells at greater length on the twenty-five years of service by Dr. Thoms at the Pharmaceutical Institute of the University of Berlin, the recognition of which was made part of the program of the Jubilee meeting.

The volume gives detailed account of the organization of the Society and its progress. Its original purpose was to bring together each month German pharmacists, interested in the advancement of pharmacy, to communicate results of their researches, discuss and exchange ideas. The 39 volumes of the *Archiv der Pharmazie,* including the *Berichte der Deutschen Pharmazeutischen Gesellschaft,* bear testimony of the Society's success and the work of Dr. Thoms.

The major portion of the book records the transactions of the Society during its forty years of existence, abstracted in such a way that the matter becomes intensely interesting. The letters, the papers, reports and other presentations, discussions and names of the participants,

make the reader acquainted with German pharmaceutical activities and developments in all of its divisions—educational and otherwise.

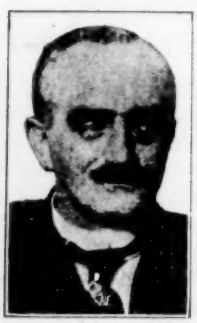
There are four full-page illustrations—the first introduces the five founders of the Society, in 1890; namely, H. Thoms, J. Holfert, Ed. Ritgert, M. Goeldner and P. Guetzkow. The next is a congratulatory letter addressed during the Society's first year of existence to the British Pharmaceutical Society at its 25th anniversary meeting. Another shows those in attendance at the dedication of the Hager memorial and the last page presents some of the German leaders in pharmacy of 1930.

The Society has paid deserved tribute to a founder and leader in pharmacy; the celebration is timely, and the Society is to be congratulated on its achievements and growth and with it go hearty wishes for continued success and advancement.

Dr. Siedler has contributed to the celebration by the preparation of the noteworthy memorial volume, whereby he has made available to pharmacists in Germany and abroad an interesting history of the German Society's activities.

CINCHONA TERCENTENARY.

Scientists of five countries were assembled at Shaw's Garden in St. Louis on October 31st and November 1st to celebrate the three hundredth anniversary of the first authentic record of the use of cinchona bark. The



Left, D. M. Kerbosch, head of the Dutch Government Experimental Cinchona Station, in Java. Right, Dr. A. R. Van Linge, Amsterdam.

countries represented were Java, Holland, Germany, Scotland and the United States. In connection with the celebration there was an exhibition of cinchona bark and its derivatives; also, among other displays showing the gathering of the bark and the instruments used, etc., were the quaint old saddle-bags of Dr. John Sappington, the Missouri practitioner whose fever pills first introduced the specific value of cinchona bark to the inhabitants of Missouri valley.

The celebration opened with a symposium on the history of cinchona as a drug, by Prof. Leo Suppan; as a chemical, by Dr. Edward Kremers; and in medicine, by Dr. George Dock of Pasadena, Calif.

Prof. Robert J. Terry of Washington University school of medicine, told the story of Dr. Sappington and his fever pills. Speakers at later sessions were Wilbur L. Scoville, Dr. Frederic Rosengarten, Dr. Torald Sollmann and Dr. Kenneth X. Maxey of the University of Virginia.

Among the speakers at the banquet were Dr. Van Linge, Dean C. E. Caspari, W. D. Besant, director of Parks and Gardens of Glasgow, Scotland; Dr. George D. Rosengarten and George C. Hitchcock, president of the Garden Trustees.

The reception given by Dr. and Mrs. Moore, at their residence, concluded the ceremonies.

FOUR ADDITIONS TO THE HALL OF FAME.

There is more-or-less of a disappointment among pharmacists, because of the failure to elect Lyman Spalding, the Father of the United States Pharmacopœia to the Hall of Fame. However, there may be some consolation in the fact that other men and women of great prominence have failed of election. There were about one hundred nominations. The successful ones are: James A. MacNeil Whistler, the painter; James Monroe, statesman; Matthew Fontaine Maury, scientist; and Walt Whitman, poet. It is interesting to note that the son of Lyman Spalding, a sea captain, and Matthew Fontaine Maury were friends, and both were interested in the subjects which gained the honor for Maury. Among prominent nominees who failed to receive the required votes are: Henry George, Noah Webster, John Hay, Francis Scott Key, William McKinley, etc.

The effort to place Lyman Spalding in the Hall of Fame will be continued. It might be stated in this connection that Monroe was

nominated five times, successively; in other words, the efforts in his behalf extended over a period of twenty-five years. Only very few have received the coveted prize on the first nomination.

AQUEOUS MIXTURES OF ACETYLSALICYLIC ACID.

As the result of experimental work, H. Finnemore and A. W. Gorringe (*Australasian Journal of Pharmacy*, July 21, 1930, page 21) state that it was considered feasible by using a substance with a large molecule, such as gum, some "buffer" or protective action against hydrolysis might be secured. Proceeding on this assumption, it was found that when compound tragacanth powder was inmixed with acetylsalicylic acid in the proportion, set out in the following prescription, practically no hydrolysis takes place in seven days, and so far as pharmaceutical requirements are concerned the mixture is entirely satisfactory. The formula is also suitable for acetylsalicylic acid gargles:

Acetylsalicylic acid	ʒii.
Compound powder of tragacanth and water to	ʒvi.

NEW AND NONOFFICIAL REMEDIES.

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, *Secretary*.

ANAEROBIC ANTITOXIN (See New and Nonofficial Remedies, 1930, p. 343).

Parke, Davis & Co., Detroit, Mich.

Gas-Gangrene Antitoxin (Combined) Refined and Concentrated-P. D. & Co.—An antitoxic serum prepared from the toxins of *B. perfringens* (*B. welchii*) and vibrion septique. Horses are immunized with the respective toxins separately. The resulting antitoxins are standardized, the unit of the perfringens antitoxin being that specified by the United States Public Health Service and that of vibrion septique antitoxin being the amount which will neutralize 100 M. L. D. of the toxin per kilogram of rabbit; the antitoxins are refined, concentrated and combined in such proportion that the quantity of the finished product in the marketed syringes contains 100 units of each antitoxin. Gas-gangrene antitoxin (combined) refined and concentrated-P. D. & Co. is proposed for therapeutic use against gas-gangrene infection caused by *B. perfringens* (*B. welchii*) and vibrion septique. It is marketed in syringes containing 100 units of perfringens antitoxin and 100 units of vibrion septique antitoxin.

Dosage.—The contents of one syringe, preferably by intravenous injection, repeated in from eight to twenty-four hours if necessary, especially in acute peritonitis and obstruction of the small bowel.

CHLOROBUTANOL (See New and Nonofficial Remedies, 1930, p. 115).

The following dosage form has been accepted:

Inhalant Chloretone, Creosote and Eucalyptol-Sorensen.—Chloretone 1.2 Gm. (20 grains); creosote 2.5 cc. (40 minims); eucalyptol 3.75 cc. (60 minims); alcohol to make 30 cc. (one fluidounce).

Prepared by C. M. Sorensen Co., Inc., Long Island City, N. Y.

PARKE, DAVIS & COMPANY'S STANDARDIZED COD LIVER OIL (See New and Nonofficial Remedies, 1930, p. 256).

The following dosage forms have been accepted:

Soluble Gelatin Capsules Parke, Davis & Company's Standardized Cod Liver Oil, 10 minims.
Soluble Gelatin Capsules Parke, Davis & Company's Standardized Cod Liver Oil, 20 minims.
Soluble Gelatin Capsules Parke, Davis & Company's Standardized Cod Liver Oil, 2.5 Gm.
Soluble Gelatin Capsules Parke, Davis & Company's Standardized Cod Liver Oil, 5 Gm.—Jour. A. M. A., Sept. 6/30.

QUININE BISMUTH IODIDE.—A substance of variable composition containing between 18 and 20.1 per cent of bismuth, between 48.7 and 53.5 per cent of iodine; and quinine.

Actions and Uses.—Quinine bismuth iodide is proposed as a means of obtaining the systemic effect of bismuth in the treatment of Syphilis (see Bismuth Compounds, New and Nonofficial Remedies, 1930, p. 94).

Quinine bismuth iodide is a red powder that clings to most surfaces even when it is dry. It is insoluble in water and most organic solvents.

Treat about 0.5 Gm. of quinine bismuth iodide with 15 cc. of 20 per cent potassium hydroxide solution, warm, add 50 cc. of water, filter off the insoluble material, wash with water, dry at 100° C., extract with five 10-cc. portions of benzene, evaporate the benzene and dry the residue at 100° C.: the residue melts at 171° C. and gives the U. S. P. X tests for quinine. Ash the filter and undissolved precipitate in a quartz crucible: a yellow residue remains.

Treat about 0.1 Gm. of quinine bismuth iodide with about 1 cc. of nitric acid: the material blackens. Add 10 cc. of water and boil: violet-colored vapors are given off.

Shake 0.030 Gm. of quinine bismuth iodide with 4 cc. of water, filter through a pledget of cotton, add 1 cc. of chloroform, 0.3 cc. each of diluted hydrochloric acid and ferric chloride solution, shake, allow to stand five minutes: the chloroform does not acquire a purple tinge (*iodides*).

Shake 0.75 Gm. of quinine bismuth iodide with 4 cc. of potassium iodide solution, filter, add 1 cc. of chloroform to the filtrate, shake and allow to stand five minutes: the chloroform does not acquire a purple tinge (*iodine*).

Transfer about 0.5 Gm. of quinine bismuth iodide, accurately weighed to a wide mouth weighing bottle and dry in a vacuum over sulphuric acid to constant weight: it loses not more than 1 per cent in weight. Transfer about 0.5 Gm. of the original, accurately weighed, to a 600-cc. beaker, add nitric acid until the color changes to black, add 100 cc. of water and boil until clear and almost colorless, add an excess of stronger ammonia water and 20 cc. of ammonium carbonate solution, allow to stand three hours, filter, wash the precipitate with water, ash, ignite in a weighed quartz crucible, add a few drops of nitric acid, evaporate and ignite to constant weight, cool in a desiccator and weigh: the bismuth oxide weighed is equivalent to not less than 18 per cent nor more than 20.08 per cent. Transfer about 0.12 Gm. of the original, accurately weighed, to a glass capsule, transfer this tube to a Carius tube containing 30 cc. of nitric acid and 0.2 Gm. of silver nitrate, seal and heat for seven hours at 210° C., cool, open the tube, transfer the contents to a large beaker and dilute to 500 cc.; allow to stand

for four hours, filter through a Gooch crucible, wash with very dilute nitric acid (1 cc. diluted nitric acid in 50 cc. of water), dry at 100° C., cool in a desiccator and weigh: the silver iodide is equivalent to not less than 48.75 per cent nor more than 53.5 per cent iodine.

TARTRO-QUINIOBINE.—A suspension of quinine bismuth iodide and sodium potassium bismuthyl tartrate in olive oil, each cubic centimeter containing quinine bismuth iodide, 0.072 Gm., sodium potassium bismuthyl tartrate, 0.032 Gm., and camphor, 0.003 Gm.

Actions and Uses.—Tartro-quiniobine is proposed as a means of obtaining the systemic effects of bismuth in the treatment of syphilis (see Bismuth Compounds, New and Nonofficial Remedies, 1930, p. 94); it is designed to secure both early action through the presence of the water-soluble sodium potassium bismuthyl tartrate, and prolonged action through the insoluble quinine bismuth iodide component of the mixture.

Dosage.—From 1 to 2 cc., administered intramuscularly twice or thrice weekly; 17 to 22 cc., representing a total amount of bismuth corresponding to about 0.6 Gm. of metallic bismuth, constituting a single course.

Manufactured by Chemisch-Pharmazeutische A. G., Bad Homburg, Frankfurt a. M., Germany (Spicer & Company, Glendale, Calif., distributor). No U. S. patent or trademark.

Tartro-Quiniobine Ampules, 2 cc.—

Transfer 2 cc. of the tartro-quiniobine, well mixed, to a weighed Gooch crucible and percolate with petroleum benzine until all of the soluble part is extracted, dry in an oven at 50° C., cool in a desiccator over sulphuric acid and weigh: the residue weighs not more than 0.215 Gm., nor less than 0.20 Gm.

Place the crucible containing the residue just weighed in an 800-cc. beaker, add 5 cc. of nitric acid to the crucible, when the acid has percolated through, tip the crucible over, add 100 cc. of water, stir until the asbestos is washed out of the crucible, boil until the solution is nearly colorless, remove the crucible by means of a glass rod, wash the crucible adding the washings to the solution, filter the asbestos using a large filter paper, wash with very dilute nitric acid (20 cc. diluted nitric acid diluted to 100 cc.) until the bismuth is all in the solution, add an excess of stronger ammonia water and 20 cc. of ammonium carbonate solution, heat to boiling and allow to stand three hours, filter through ashless paper, ignite in a quartz crucible, cool, add a few drops of nitric acid, evaporate and then ignite, cool in a desiccator over sulphuric acid, weigh: the residue when calculated to bismuth is not more than 0.0615 Gm., nor less than 0.0585 Gm.

The quinine bismuth iodide in tartro-quiniobine conforms to the N. N. R. standards for this substance.

SODIUM POTASSIUM BISMUTHYL TARTRATE.—A basic sodium potassium bismuth tartrate containing from 40.75 to 41.25 per cent of bismuth.

Actions and Uses.—Sodium potassium bismuthyl tartrate is proposed as a means of obtaining the systemic effects of bismuth in the treatment of syphilis (see Bismuth Compounds, New and Nonofficial Remedies, 1930, p. 94).

Sodium potassium bismuthyl tartrate is a white, heavy powder, soluble in water and insoluble in organic solvents.

During the ignition of about 0.1 Gm. of sodium potassium bismuthyl tartrate in a quartz crucible, a small globule of metallic bismuth forms that oxidizes on extended heating. The residue is yellow, alkaline to litmus, and effervesces with acids.

Transfer 0.1 Gm. of sodium potassium bismuthyl tartrate to a test-tube, add 5 cc. of water and sufficient diluted hydrochloric acid to dissolve the precipitate first formed, add 0.5 cc. of barium chloride solution: no cloudiness appears within 2 minutes.

Transfer 0.1 Gm. of sodium potassium bismuthyl tartrate to a test-tube, add 5 cc. of water and sufficient diluted nitric acid to dissolve the precipitate first formed, add 0.5 cc. of silver nitrate solution: no precipitate appears.

A sample of sodium potassium bismuthyl tartrate loses not more than 0.3 per cent of its weight when dried in a vacuum over sulphuric acid.

Transfer about 0.5 Gm. of sodium potassium bismuthyl tartrate, accurately weighed, to an Erlenmeyer flask, add 100 cc. of water, add diluted hydrochloric acid a drop at a time until the precipitate that forms redissolves, saturate with hydrogen sulphide, filter, wash successively with water, alcohol, chloroform and ether, dry at 100° C., cool in a desiccator, weigh: the bismuth sulphide weighed is equivalent to not less than 40.75 per cent nor more than 41.25 per cent. —*Jour. A. M. A., Sept. 13/30.*

TUBERCULIN-KOCH (See New and Nonofficial Remedies, 1930, p. 358).

Eli Lilly & Company, Indianapolis.

Old Tuberculin, Human Strain, Concentrated (See New and Nonofficial Remedies, 1930, p. 360).—Also marketed in packages of two vials, one containing a stated amount of tuberculin and the other sufficient diluent to make 1 cc. as follows: Dilution A, containing 0.1 cc.; Dilution B, containing 0.01 cc.; Dilution C, containing 0.001 cc.; Dilution D, containing 0.0001 cc.; Dilution E, containing 0.00001 cc.; and Dilution F, containing 0.000001 cc.

CHINIOFON (See New and Nonofficial Remedies, 1930, p. 120).

Chiniofon-Searle.—A brand of chiniofon-N. N. R.

Manufactured by G. D. Searle & Co., Inc., Chicago. No U. S. patent or trademark.

Tablets Chiniofon-Searle, 0.25 Gm. (4 gr.).—*Jour. A. M. A., Sept. 20/30.*

LONDON NARCOTIC CONFERENCE.

John K. Caldwell, narcotics expert of the Department of State, is now in London as the representative of the United States at a conference on international narcotics' problems called by the British government.

The conference is preliminary to a general international narcotics convention called by the League of Nations to meet in Geneva next May, and is for the purpose of preparing agenda. Representatives of drug manufacturers in several manufacturing countries may be asked to submit their suggestions for machinery for determining the medical needs of the world, and the conference hopes to work out a tentative proposal for apportioning quotas to producing countries after the medical needs are determined.

PERSONAL AND NEWS ITEMS.

LESLIE G. HENDERSON, PRESIDENT OF CANADIAN PHARMACEUTICAL ASSOCIATION.

Leslie G. Henderson, president of Canadian Pharmaceutical Association, was born in Montreal, in 1884. The family moved to Victoria, B. C., in 1886, where the father became associated with Langley, Henderson & Co., wholesale druggists. The future president received his early education in Victoria; later, he went to Montreal, where he was employed for a time with the National Drug Company, Ltd. He returned to Victoria and

LESLIE G. HENDERSON.

joined the staff of the firm of which his father was a partner. Seeking retail pharmacy experience, he served an apprenticeship with Terry and Marrett, of Victoria. Thereafter, he matriculated at the Ontario College of Pharmacy and was graduated in 1906.

In 1908, Mr. Henderson entered business on his own account in Vancouver and has developed one of the largest independent retail pharmacies of the west. He is the youngest president the Canadian Pharmaceutical Association has had and is an enthusiast for the betterment of pharmacy in Canada, both professionally and commercially.

Frederick B. Kilmer has donated to the AMERICAN PHARMACEUTICAL ASSOCIATION a bound volume of the *Journal des Scavans*, for the year 1678. An article, by the donor, referring to this volume is printed in the JOURNAL, A. PH. A., for June 1930, entitled "The Birth of the Scientific Journal."

Miss Lucia E. Lyon, daughter of the late Dr. A. B. Lyon, member of the AMERICAN PHARMACEUTICAL ASSOCIATION and worker on several revisions of the U. S. Pharmacopœia, has donated the following books from the library of her father: Dr. Duncan's edition of the Edinburgh New Dispensatory (1804), American Edition. London Pharmacopœia, published in 1746, with a preface stating that it is a memorial of Dr. Henry Plumptre. American Medical Botany with colored engravings. By Jacob Bigelow, M.D. Published at Boston in three volumes—Volume I, published in 1817; volume II, in 1818; volume III, in 1820. The Family Flora and Botanical Materia Medica illustrated by colored engravings, Peter P. Good, and published at Cambridge, Mass., in two volumes, 1854.

Elmer Wirth, assistant professor at the University of Illinois, is spending a year working in the laboratory of our *honorary member*, Professor Van Itallie, of the University of Leyden. Professor Wirth is well pleased and writes interestingly of the University city and of the other Holland universities. Recently, he had the pleasure of meeting Dr. Casparis, editor of the *Swiss Apotheker Zeitung*, who stopped over for a visit with Dr. Van Itallie. The latter is a former president of the International Pharmaceutical Federation.

Professor Wirth's work is largely phytochemical. He has isolated two alkaloids which heretofore have not been studied, and he will spend the greater part of the year investigating them.

Mrs. Wirth and daughter, Marilyn, are enjoying their stay in Holland, and the family of three are beginning to master the Dutch language.

Dean Willis G. Gregory has analyzed the attendance of delegates at the recent Pharmacopœial Convention. He states that a study of the list of delegates in attendance shows that two have attended the last five consecutive conventions, they are Willis G. Gregory and Julius A. Koch. The following have attended four of the last conventions: Wm. C. Anderson, James H. Beal, P. E. Hommell, E. V. Howell, L. F. Kebler, Edward Kremers, A. P. Lohness, Henry H. Rusby, Charles Whittlelsey.

Nicholas S. Gesoalde, president of the New York State Pharmaceutical Association, will be entertained at a dinner on November 26th, at

Hotel McAlpin, by the Italian Pharmaceutical Association of New York City.

The Alexandria (Va.) Gazette, of October 15th gave an extended account of the Pharmacy Week window of **Walter S. Nicklin**, in which he outlined the history of pharmacy and its development, showing the earlier and later periods by pictures, and the *materia medica* of the periods. We thank Mr. Nicklin for photos of the window.

President L. S. Williams, of Maryland Pharmaceutical Association, has aided greatly in bringing back the show globes into pharmacies. He exemplified this interest in his Pharmacy Week window, the display included several old mortars and pharmaceutical apparatus; a "chemical garden" also attracted the attention of the passers-by. The window carried the message of pharmacy and expressed the professional viewpoint of Mr. Williams. We are indebted to him for a good photo of the display.

Secretaty Arthur Lee Phelps, Arizona, in the *Monthly Bulletin*, seeks to find clerks for pharmacies in Arizona and locate pharmacists seeking positions. The October *Bulletin* carries the address of **President Christensen** to the Arizona Pharmaceutical Association.

Rudy Vallee is the son of **Charles H. Vallee**, former Westbrook, Me., pharmacist. "The Connecticut Crooner" worked in his father's store during his earlier years.

The Druggist is doing good work in its endeavor to bring about coördinated efforts of state and national bodies. We quote: "The necessity of close coöperation with the national association cannot be stressed too much. The state organizations are making wonderful progress, as it is—but the added influence and impetus that the AMERICAN PHARMACEUTICAL ASSOCIATION can give to plans and projects is unlimited. The allegiance of the individual druggist is to his state association, but he must see to it that this organization works in conjunction with the national. As Dr. Bliss put it. 'It is not coöperation, but working as a unit that brings success.'"

The *Bulletin*, issued by Secretary Walter D. Adams of Texas Pharmaceutical Association, reports the meeting of the Executive Committee in which it is stated that Dallas has been chosen for next year's meeting, date June 15th–18th. Reports were made on the *Texas Druggist*, the Drug Show of the Houston Convention, on Druggists' Group Life Insurance, and scholarship loans by the Association to students in colleges of pharmacy.

J. B. Frith, of the Dickens Pharmacy, Rochester, England, is owner of a desk used by the novelist, in the preparation of some of his copy, in this apothecary shop.

Arthur D. Little has been selected to receive the Perkins Medal for 1931. The award is made by a committee representing five leading chemical societies and their basis of the selection is a lifetime of chemical achievement.

November 1st, Hoffmann-LaRoche, celebrated the 25th anniversary of its establishment in the United States, with a reception and luncheon at its new plant in Nutley, N. J. Dr. Emil Barrel, president of the company, came over from the European home office of Hoffmann-LaRoche in Basle, Switzerland, to attend the celebration and assist Elmer H. Bobst, general manager and treasurer, in greeting executives of the company on the completion of the first quarter century of its business career in the United States.

AN APPRECIATION OF WILLIAM ARTHUR FROST.

Dean Frederick J. Wulling has favored the JOURNAL with an appreciation, which was adopted and spread upon the minutes of the College of Pharmacy of the University of Minnesota, September 29th. We are taking the liberty of quoting the last two paragraphs of this beautiful tribute and expression of esteem: "The faculty regards the loss of Mr. Frost as irreparable. He did a noble work in the interests of pharmaceutical education and therefore in the interest of pharmacy at large. He did this work when it was most needed, and the College and pharmaceutical education in general freely acknowledge their indebtedness to him. His very life and work are interwoven in the fabric of Minnesota pharmacy. He will go down in Minnesota pharmaceutical history as one of the most helpful workers for everything good for pharmacy.

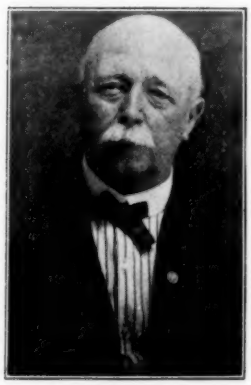
"The faculty spreads this appreciation upon its minutes in grateful memory of one of its co-workers in the field of educational pharmacy. In the roster of Minnesota pharmacy, the name of William Arthur Frost is among the fathers of professional pharmacy in Minnesota and the Northwest, a fact which carries enduring honor."

OBITUARY.

WILLIAM MITTELBACH.

William Mittelbach, former president of Missouri Pharmaceutical Association, its treasurer for thirty-three years, and member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1891, died October 14th, aged 74 years.

July 23rd the druggists of Missouri paid tribute to this veteran member of their Association. While saddened by his passing they are gladdened because they had the opportunity of making the last weeks of his life happier. He had served honorably and well and won the esteem of his fellow citizens. The deceased was born in Boonville and had always resided here except during the years of absence at Missouri State University and at Philadelphia College of Pharmacy, from which institution he graduated in 1879. His *Alma Mater* also honored him with the Ph.M. degree. He had conducted a pharmacy in the same building for nearly a half century when he disposed of it to W. P. Pieper, one of the thirty-two men who had worked under him as apprentices.



WM. MITTELBACH.

Mr. Mittelbach joined the Missouri Association in 1883; he became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1891 and served as first and second vice-president, successively, 1904–1907. From 1909 to 1914 he was member of the Missouri Board of Pharmacy, serving as president during the entire period.

He was active in civic affairs and contributed largely to the beautification of cemeteries, not only in Boonville and Cooper County, but through creation of interest in other sections of the state.

Mr. Mittelbach is survived by his widow and two daughters. Services at the home were conducted by Rev. Frederick Stoerker of the Evangelical Church, of which the deceased was long a member. The ceremonies at the grave were conducted by the Knights of Pythias. The funeral was largely attended by friends and members of various pharmaceutical organizations, whom they regarded highly as friend and co-worker. He was for many years a strong supporter of the late Dr. H. M. Whelpley in A. PH. A. and State Association promotions; he attended nearly all of the meetings of the latter since he became a member, and for many years was a regular attendant at the annual meetings of the former organization. Kindliness and sincerity were pronounced qualities of the deceased.

JOSEPH FREDERICK VOIGT.

Joseph F. Voigt, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1893, died at his home on Lookout Mountain, September 3rd, aged 66 years.

Mr. Voigt came to Chattanooga from Jeffersonville, Ind., in 1886, and with two of his brothers opened up a drug store under the firm name of Voigt Brothers. This developed into a successful business and is now styled Voigt & Co., of which the deceased was president.

The deceased took an active interest in everything pertaining to Chattanooga and was known for his civic spirit and charitableness. He was a former president of Chattanooga Chamber of Commerce, a charter member of the Mountain City Club and the Golf and Country Club.

Mr. Voigt was a member of the Tennessee Board of Pharmacy for a number of years and interested in association work. The Rt. Rev. Monsignor Francis Sullivan of SS. Peter and Paul's Church officiated and at the obsequies some of Chattanooga's foremost business men were represented in the list of honorary pallbearers. The large attendance attested to the esteem in which Mr. Voigt was held.

The deceased is survived by his widow and one son, Joseph Frederick, Jr.

FREDERICK W. McNESS.

F. W. McNess, secretary and one of the founders of the Furst-McNess Company of Freeport, Ill., died in Chicago, where he had gone for medical attention, October 21st, aged 51 years.

Mr. McNess was born at Cleveland, Ohio, where he received his earlier education and then attended the Philadelphia College of Pharmacy,

from which institution he was graduated in 1905. Soon after graduation he came to Freeport and organized the company of which he was the secretary, which developed into one of Freeports' successful business enterprizes. Mr. McNess was highly esteemed and readily made friends in business and among his fellow citizens. He was a prominent member of the Masonic bodies and held membership in the Rotary club, Freeport Country Club and a number of state and national organizations, among them the AMERICAN PHARMACEUTICAL ASSOCIATION, which he joined in 1906.

Mrs. McNess, before her marriage, was Miss Della Palmer, who, with a son and daughter, survives her husband. The latter is a freshman at the University of Wisconsin and the former is attending school at Cleveland.

The funeral services were held in the First Presbyterian Church and, thereafter, the body was taken to Cleveland for burial.

WILLARD STOWELL RICHARDSON.

Willard S. Richardson, veteran pharmacist of Washington, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died at his home in Washington, D. C., October 28th, aged 72 years.

Mr. Richardson came to Washington from Rockingham, Vt., his birthplace and home until after he had reached his majority. He operated three retail pharmacies, in Washington, at one time, before his retirement from active business life. He was a trustee of the National College of Pharmacy, a charter member of the Washington Chamber of Commerce and a member of the Board of Trade. He was highly regarded as pharmacist and citizen.

Mr. Richardson was a former vice-president of the AMERICAN PHARMACEUTICAL ASSOCIATION, participated actively in the District of Columbia Branch, A. PH. A., in the local associations and National Association of Retail Druggists.

The deceased is survived by his widow and two married daughters.

FRANK M. MARES.

Frank M. Mares, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died September 6th, in a hospital at Cobb, Ireland. The deceased conducted a pharmacy in Chicago for more than forty years. He was a native of Wisconsin, born at Manitowoc, June 1864. Mrs. Mares died in 1925.

After completing a tour of continental Europe Mr. Mares came to Ireland, having planned an extended trip with several friends before returning to Chicago. Mr. Mares was interested in the success of the National Association of Drug Clerks and had endowed a room in the Druggists' Home in memory of his wife.

His body was brought back to Chicago for burial.

DAVID PHILIP SCHINDEL.

David P. Schindel, a former president of Maryland Pharmaceutical Association, and member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1914, died at his home in Hagerstown, Md., October 20th. The deceased had been in poor health for nearly a year.

Mr. Schindel received his early education in Hagerstown and, thereafter, matriculated at the Philadelphia College of Pharmacy, from which institution he was graduated in 1896. He returned to his home city and engaged in the drug business; during later years, his son David P., Jr., has been a member of the firm and the business is being continued under his management.

The parents of the decreased were Benjamin Philip and Julia C. (Reichard) Schindel, representatives of old and distinguished Maryland families, highly regarded in the community. The son developed his business on the high plane of pharmaceutical service and held the respect of his fellow citizens and coworkers. During the World War Mr. Schindel served on the Washington County board, which looked after pension money for soldiers at the front, who provided money for dependents. For many years he was Chairman of the Christmas Seal sale for the County and was one of the charter members of the Public Health Association. He held membership in the First Brethren Church and had served as treasurer and member of its official board. He was affiliated with the Masonic bodies and other fraternal organizations.

Mr. and Mrs. Schindel (née Miss Leah Eyerly) were married June 3, 1903; the widow, a daughter and a son survive the deceased. The funeral services were largely attended by citizens of Hagerstown and representatives of the Maryland Pharmaceutical Association, and AMERICAN PHARMACEUTICAL ASSOCIATION, who came to honor and pay respects to their departed friend and co-worker.

ROBERT T. WINCOTT.

Robert T. Wincott, veteran druggist and traveler, died July 18th at his home in Minneapolis, aged 67 years.

Mr. Wincott was born in Birmingham, England, and received his early pharmaceutical training as an apprentice with Henry Pratt of Warwick; later, he took charge of a London drug store. Coming to the United States he engaged in the drug business in North Dakota and, later, opened a store in St. Paul. For several years he traveled for Seabury and Johnson; in 1902 he became associated with Johnson & Johnson, representing them until his last illness. He was always active in association work and contributed largely to accession of membership and programs of the meetings.

Mr. Wincott was a life member of the Minnesota Pharmaceutical Association, a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1920, and a charter member of the Minneapolis Veteran Druggists' Association. He also helped organize the North Dakota and Minnesota Travelers' Auxiliaries and served as president, secretary and treasurer of each organization. Members of the veteran druggists' organizations of Minneapolis and St. Paul served as pall-bearers and guard of honor. Surviving are his widow, one son and four daughters.

WOOD WILES.

Wood Wiles—a prominent retail pharmacist of Bloomington, Ind., and member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1914—died at his home, November 5th. Mr. Wiles held membership in the Masonic bodies and was a member of the First Presbyterian Church of Bloomington. He had been active in civic affairs and was a former president of the Bloomington Chamber of Commerce and of the Rotary Club. The deceased is survived by Mrs. Wiles and a son, Robert Wiles.

Dr. Adolf Engler—professor emeritus of botany at the University of Berlin, well known to pharmacists as author and co-author of many works relating to all divisions of botany—died at his home in Berlin, Germany, October 10th, aged 86 years.

Dr. Engler was professor at Kiel and Breslau before coming to the University of Berlin in 1889, as successor of the late Professor Eichler. No attempt will be made to enumerate all of his works; among them are: "Versuch einer Entwickelungs-geschichte der Pflanzenwelt," "Die natürlichen Pflanzenfamilien," with Prantl and others. The latter embodies Engler's botanical system which has found quite general recognition. Other works relate to "Die Vegetation der Erde," Pflanzengeschichte," "Pflanzengeographie," "Syllabus der Pflanzenfamilien," etc. He traveled extensively, and apart from his contributions to systematic botany, in which he was outstanding, as well as in his research activities, Engler succeeded in building up the Botanical Museum and Botanical Garden at Dahlem-Berlin, which will remain as a memorial to his practical application of his systematic studies.

Dr. Ellwood Hendrick, curator of the Chandler Chemical Museum of Columbia University, author of many books popularizing chemistry, and leading advocate of wider recognition of research chemists, died October 29th at his home in New York City, of pneumonia. He was in his sixty-ninth year. He is known to pharmacists through his writings in magazines and other publications; among his books are "Everyman's Chemistry," "Opportunities in Chemistry," etc.

Charles Harrison Goddard died October 22nd, aboard ship en route from Europe to New York City. He was fifty-nine years old.

Mr. Goddard promoted the organization of the American Druggists' Syndicate and was for many years its directing head. The organization and history of the A. D. S. has much of interest. While engaged in operating a newspaper in Mercur, a mining town of Utah, Mr. Goddard made the acquaintance of George W. Luft, a retail druggist of the town. Mr. Luft was then mayor and a personage of influence, in addition to being the town druggist. At night, around the stove in the Luft drug store, were discussed drug store problems which gave Goddard the inspiration for organizing the Syndicate.

We are advised of the death of Mrs. Hazel Reynolds Teeters, wife of **Dean Wilber J. Teeters,** of the College of Pharmacy, University of Iowa, to whom sympathy is extended in his bereavement.

Mrs. Teeters was active in university and city social circles and was a member of a number of clubs. Three years ago the garden section of the Women's club with which she was actively associated presented her with a gold medal for her services as *Chairman* of a flower shop, sponsored by the club.

Mrs. Teeters is survived by her husband and an infant son.

SOCIETIES AND COLLEGES.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

The 56th annual meeting of the National Wholesale Druggists' Association was held in Chicago during the week of October 12th. The registration totaled 670. Coöperation and better understanding between the divisions of the drug-trade activities were key notes of the convention.

President H. C. Christensen, of the A. PH. A. extended the greetings of that organization and spoke briefly. President Julius Riemenschneider of the N. A. R. D. spoke for that organization. Greetings of the American Drug Manufacturers Association were extended by Dr. A. S. Burdick. Frank A. Blair spoke for the Proprietary Association, and J. G. Searle for the American Pharmaceutical Manufacturers' Association.

Among the speakers of the convention were Hon. Clyde Kelly, Dr. J. M. Doran and H. J. Ostlund. Prof. E. N. Gathercoal extended greetings of the National Conference on Pharmaceutical Research and spoke regarding the Chicago World's Fair Centennial Celebration, part of which is embodied in an editorial of this issue of the JOURNAL; brief statements from the address follow:

"This Exposition will depict a Century of Progress, with the contributions of pure and applied science to industrial development during the last 100 years as the main theme. Great plans are already well developed and are being actually worked out into concrete form for this Exposition. It will stretch out for miles along the lake front from the Art Institute south toward Jackson Park on newly made land in Lake Michigan. One hundred million dollars is being spent upon it."

"...Each of the National organizations in pharmacy is being requested to appoint one member to this committee and it is expected that the first meeting of this committee will be held this year. Perhaps it is the privilege of your great organization to elect or appoint at this convention the first member of the Pharmacy World's Fair Committee. Certainly the most able men in pharmacy should be placed on this committee for here is a splendid opportunity for pharmacy to maintain its prestige with the other professions."..."While no plans have been made for the pharmacy exhibit, would it not be appropriate for the wholesale druggists to prepare a great globe and show the original packages of drugs and chemicals entering the United States from all parts of the world?"

The report of the Committee on Memorials of Deceased Members was read by Chairman Harry J. Schnell.

Secretary E. L. Newcomb gave a comprehensive outline of the activities of the Association during the year and also presented a report of the treasurer which showed a larger balance on hand than the Association had reported for a number of years.

The report of the Committee on Manufactures was read by Chairman James Morrisson. In discussing this report Frank Hayden spoke of the growth of the strictly professional type of pharmacy which may open up a new field of distribution for manufacturers and also the possibility of routine selling and advertising to reach this specialized branch of the drug business.

Secretary Samuel C. Henry of the N. A. R. D. spoke optimistically of the future of the drug business. He commended the work of the Druggists Research Bureau, emphasizing the benefits for the retail drug trade.

The following officers were elected for the ensuing year:

President, James M. Penland, Dallas, Texas; *First Vice-President*, Harry G. Billmire, Chicago; *Second Vice-President*, E. H. DeMoss, Louisville, Ky.; *Third Vice-President*, W. K. Love, Memphis, Tennessee; *Fourth Vice-President*, W. G. Allen, Tampa, Fla.; *Fifth Vice-President*, Peyton Hawes, Spokane. The new members of the *Board of Control* are: M. E. Sherman, Des Moines, Iowa; Walter Brunswig, Los Angeles; Warner James, Brooklyn; and J. Mahlon Buck, Philadelphia.

AMERICAN PUBLIC HEALTH ASSOCIATION.

Dr. Hugh S. Cumming, surgeon general of the United States Public Health Service, was installed on October 31st as *President* of the American Public Health Association, at its Fort Worth meeting, succeeding Dr. A. J. Chesley, of St. Paul, Minnesota. Dr. William C. Hassler, health officer of San Francisco, was named *President-Elect* to take office when Dr. Cumming has completed his term in 1931. Other officers named who will assume office next year are Dr. Rafael Silva, of Mexico,

First Vice-President; Dr. J. W. S. McCullough, of Toronto, *Second Vice-President;* Dr. A. H. Flickwir, of Fort Worth, *Third Vice-President;* Dr. Louis I. Dublin, of New York, *Treasurer,* and Dr. W. S. Rankin, of Charlotte, North Carolina, *Chairman* of the executive board. Homer N. Calver, of New York, was reappointed *Executive Secretary.*

FEDERAL WHOLESALE DRUGGISTS' ASSOCIATION.

The Federal Wholesale Druggists' Association was held at Rochester, September 2nd. The following officers were elected:

President, J. H. Marshall, Minneapolis; *Vice-President,* W. W. Stephens, Toronto; *Secretary,* R. E. L. Williamson, Baltimore; *Treasurer,* O. J. Cloughly, St. Louis; *Executive Committee,* J. J. Dreyer, Newark; J. C. Kreiger, Buffalo; F. W. Alexander, Boston; N. D. Parker, Washington; H. L. Metzger, Rochester.

The address of President J. H. Marshall dealt largely with the business of the Association. He stated in his address that in order to make the work of the Association most successful it was necessary to outline a system of coöperative buying and also of determining on uniform lines of merchandise, and uniform terms to retail members of the Association.

As a token of appreciation President Marshall was presented with a cornelian cameo ring the gift of 150 delegates of the convention. The presentation was made by Secretary R. E. Lee Williamson.

Among the resolutions adopted by the Association the following is of particular interest:

> *Resolved* that the Federal Wholesale Druggists' Association go on record as endorsing the valuable work accomplished for the pharmacist and pharmacy by the AMERICAN PHARMACEUTICAL ASSOCIATION and that a copy of this resolution be sent to the secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION.

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION.

The semi-annual meeting of the American Pharmaceutical Manufacturers' Association will be held in Washington, D. C., December 10th–12th, at Hotel Washington. An interesting program for the meeting has been prepared.

The American Pharmaceutical Manufacturers' Association has awarded the first prize of $100.00 in its contest for the best paper relating to manufacturing pharmacy, by students in selected colleges of pharmacy, to Urban O. Oakdale and Joseph John Thompson, both students of the College of Pharmacy of the University of Michigan. The study of the essay was on a general method for the determination of halogens in organic compounds. The essay contests are conducted by the Association through its Committee on Research Awards.

WILMINGTON PHARMACISTS ENTERTAIN.

The "Q-S" Club, a social pharmaceutical organization, of Wilmington entertained the medical profession of Delaware at a dinner given at the Hotel DuPont-Biltmore in that city on October 23rd. For some years the Club has given attention to the need of a closer understanding between medicine and pharmacy and has made this thought the dominant one in its annual dinners. Invitations were sent to the physicians of Delaware and a large number were in attendance. There were speeches by representatives of the pharmaceutical and medical professions. The keynote of the evening was coöperation and the importance of working and pulling together, with the thought in mind that the public benefits greatly by coöperation of the public health groups.

MEETING OF OFFICIAL AGRICULTURAL CHEMISTS.

The Association of Official Agricultural Chemists held its annual meeting in Washington, October 20th to 22nd.

The Association completed final details for the publication of its 1930 edition of "Methods of Analysis," which is revised every five years. The manuscript of this volume will be ready for the printer by the end of the year, and it is expected to be available early in the Spring.

Officers elected for the ensuing year are as follows: *President,* H. D. Haskins, of the Agricultural Experiment Station at Amherst, Mass.; *Vice-President,* A. E. Paul, of the United States Department of Agriculture, Chicago station; *Secretary-Treasurer,* W. W. Skinner, of the Department of Agriculture,

Washington; additional members of the *Executive Committee*, F. C. Blanck, of the Department of Agriculture, Washington; J. W. Kellogg, of the Pennsylvania Department of Agriculture, Harrisburg; E. M. Bailey, of the Connecticut Experiment Station, New Haven; and R. Harcourt, of the Experiment Station of Guelph, Ontario.

LEGAL AND LEGISLATIVE.

CENTRAL OPIUM BOARD, COUNCIL OF THE LEAGUE OF NATIONS.

We are quoting a press dispatch from Geneva of October 18th in the following: "The new report of the Central Opium Board to the Council of the League of Nations, which in broad lines was adopted October 18th, reflects a stronger will to keep a vigilant eye on the narcotic traffic and otherwise get down to grips with the illicit trade than the various League organizations have been accustomed to showing. In general the board clearly is not satisfied with the situation and suspects many discrepancies in the statistics on narcotic production, distribution and consumption which the governments are furnishing it.

"The board's efforts to determine what constitutes the medicinal needs of a country, so as to enable it to determine the sale of codeine, show that French consumption is four times greater than that of the United States, which is considered to represent the world average. On the other hand, the French consumption of cocaine is a trifle less than that of the United States, which is seventeen pounds to 1,000,000 inhabitants.

"The largest consumers of cocaine are Japan's Kwangtung territory in China, fifty pounds to 1,000,000 population; Australia, thirty-two pounds; Japan, thirty-one; Estonia twenty-seven pounds, and Sweden, twenty-six, all the others being below the American average. Australia thus consumes twice as much as any other English-speaking country and Estonia and Sweden twice as much as any of their Baltic neighbors.

"All these figures are supposed to represent legitimate consumption for medicine, but faced with such strange discrepancies the board asks whether the abnormal consumption of some countries is not due partly to narcotic drugs, ostensibly needed for medical purposes, escaping into the illicit traffic, and has begun inquiries.

"Another thing worrying the board is the great increase in the production of narcotics such as codeine, excluded from the Geneva drug convention, an exclusion which, the board finds, offsets the good effects the convention seems to have had in its restricted field."

HANKOW OPIUM REVENUE.

New York Times, special correspondence, has stated that "open profiteering by the Hankow city government on the opium trade is frankly discussed this week in *New Hankow* and other Chinese newspapers, which reveal that instead of making efforts at suppression of the traffic the city looks to it for an important contribution to revenue.

CAFFEINE IN CEREAL BEVERAGES.

The sale of cereal beverages or similar types of non-alcoholic drinks, which have been doctored or "pepped up" by the addition of caffeine, is prohibited by the state beverage law, according to the Bureau of Foods and Chemistry, Pennsylvania Department of Agriculture. A cereal beverage containing caffeine is considered under the law as being misbranded and adulterated.

ALCOHOL RULE CHANGES COLLATED BY INDUSTRIES.

Washington representatives of alcohol-using industries, on October 23rd, made up a list of detailed suggested changes in the new industrial alcohol regulations for presentation to the Industrial Advisory Council of the Bureau of Industrial Alcohol.

The meeting was called by H. E. Howe, secretary of the council, and the report of the group will be for the use of the council in preparing comments on the regulations as invited by James M. Doran, Commissioner of Industrial Alcohol.

The group discussed regulations No. 2 and No. 3, covering both medicinal liquor and industrial alcohol, and prepared a long list of detailed changes which the members consider desirable. All were agreed in taking a stand of coöperating with the Bureau of Industrial

Alcohol and adhering firmly to regulations adequate to safeguard legitimate alcohol and liquor. They insisted, however, that the proper functioning of business be not interfered with and that business be not obliged to take over policing activities or the functions considered to be the duty of the Government.

The new regulations will not take effect until January 1st, and it is likely that the draft may be changed somewhat after receipt of the report of the council.

BOOK NOTICES AND REVIEWS.

Die Riechstoffe und ihre Derivate, "Aromatic Bodies and Their Derivatives;" *Die Aldehyde*, Volume I, Part Two, edited by Director Alfred Wagner. A. Hartleben's Verlag, Wien and Leipzig, 1929; 362 pages; price, paperbound, 25 marks.

The present monograph is one of a series of highly specialized treatises on perfumes and allied bodies, edited under the general directorship of Alfred Wagner, editor of the well-known journal, *Die Riechstoffindustrie*. The complete work is planned to consist of three large volumes, the first volume, in three parts, dealing with aldehydes of various kinds; the second volume dealing with phenols and phenol ethers; and the third dealing with alcohols and ethers. The monograph before us is the second part of the first volume and treats of aldehydes of the alicylic series. This work has been prepared by three authors, Director Alfred Wagner, Chemist Alfons M. Burger and Professor F. Elze. The present work is one of the best of its kind inasmuch as it deals very extensively and in detail with every phase of perfume chemistry. This volume is devoted to the alicyclic aldehydes, and here we have a discussion not only of the common and well-known aldehydes employed in perfume chemistry, such as benzaldehyde, cuminaldehyde and cinnamic aldehydes, but also many rare ones. Eighty-five pages are devoted to the treatment of cyclic aldehydes with saturated side chains; seventy pages are devoted to aromatic mono-aldehydes with unsaturated side chains. Thirty-two pages are devoted to the heterocyclic mono-aldehydes; and there are separate sections dealing with keto-aldehydes and with higher aromatic aldehydes of the fatty acid series. The more important and widely used chemicals belonging to these groups are described in great detail, and this detailed description includes not only a complete exposition of their chemical structure, their preparation, tests for purity, detection in small quantities, and various reactions employed in studying them, but also gives the history of the compounds and their uses and an exhaustive literature of a highly specialized character bearing on the subject. One of the most interesting and valuable features of this work is numerous tables showing the extensive relationships between the various chemical groups. The value of these can be fully appreciated only by specialists in chemistry and then only by those chemists who specialize in this particular department of organic chemistry.

Among the various subjects treated in this book we have the well-known aldehydes such as perillaaldehyde, myrtenal, phellandral, farnesal, cyclocitral santalol, benzaldehyde, phenylacetaldehyde, hydrocinnamylaldehyde, cuminaldehyde, cinnamylaldehyde, α-amylaldehyde and α-furfurol. Among the less well-known compounds the following may be mentioned: hexahydrobenzaldehyde, suberenaldehyde, suberanaldehyde, cyclohexylacetaldehyde, cyclohexylidenacetaldehyde, cryptal, camphenilanaldehyde, noreksantalol, the toluylaldehyde, *p*-tolylacetaldehyde, ethylbenzaldehyde, hydratropaaldehyde, the dimethylbenzaldehyde, the methylhydrocinnamylaldehyde, methylcinnamylaldehyde, etc.

Even a superficial perusal of this work reveals that the writers are experts in their subject and have drawn not only upon their own extensive practical experience with the compounds studied but have also made an exhaustive study of the literature. The text is printed on excellent paper and, in addition to the many tables already referred to, contains a number of valuable illustrations. This work should appeal especially to chemists, perfumers, pharmacists and others interested in aromatic compounds.—DAVID I. MACHT.

Aids to the Mathematics of Pharmacy. By ARTHUR W. LUPTON, M.C., Ph.C., Joint Principal Leeds College of Pharmacy; one time member of the Board of Examiners of the Pharmaceutical Society for England and Wales. Published by William Wood & Company, 156 Fifth Ave., New York. 95 pages. Price

$1.50. From the preface it may be concluded that there is need for a book dealing with the mathematical side of pharmacy in Great Britain. The book serves this purpose. A number of "short cut" methods are given; some of these require memorizing; others do not shorten the calculation very much; the greater number, however, are useful methods for making mental calculations. Proving the correctness of a calculation is more important than a "short cut"—both can and should be combined.

It should be remembered that British weights and measures are employed, so while the principle applies the factors differ. The book includes tables of antilogarithms and explains their applications, and logarithms are also given.

Popular Science Talks. Season of 1929. Presented by members of the faculty of the Philadelphia College of Pharmacy and Science. Published under the auspices of the *American Journal of Pharmacy*, with the aid of a fund established in memory of Thomas D. Simpson. Edited by Ivor Griffith; 360 pages. Price $1.00.

This is the seventh volume of popular lectures open to the public and delivered by members of the faculty of Philadelphia College of Pharmacy. They are not arranged in a course, nor is there any interdependence or connection between the lectures. They are presented in a non-technical form, but without sacrificing scientific accuracy or completeness; usually they are illustrated. The subjects discussed during the season of 1929 and published in this volume are: "The Modern Sun Cult," by J. W. Sturmer; "The Romance of Beverages," by Charles H. LaWall; "Soil and Sod," by Arno Viehoever; "Time—What Keeps It?" by George Rosengarten; "How Much Do You Weigh?" by Adley B. Nichols; "The Cosmetic Urge," by Ivor Griffith; "Snakes and Snake Protection," by Louis Gershenfeld; "Heart Beat and Blood Flow," by Horatio C. Wood, Jr.; "The Carbon Oxide Brothers, Mon and Di," by Freeman P. Stroup; "The History and Mystery of Pyrotechny," by E. Fullerton Cook; "Little Drops of Water," by Marin S. Dunn; "Evolution of the Motion Picture," by George Wesley Perkins; "Iodized Salt—a Food or a Drug?" by D. W. Horn. The continued interest shown by the public, and the well and favorably known contributors, speak for the value of the series of popular talks.

Science in the Kitchen. Published by Mellon Institute, Pittsburgh. For several years research specialists of Mellon Institute of Industrial Research, Pittsburgh, Pa., have delivered series of popular radio talks, broadcast from the University of Pittsburgh Studio of Station KDKA, on recent advances in science. During the past winter the series consisted of eight talks: "The Well-Planned Kitchen," "The Intelligent Purchasing of Foods," The Care of Food in the Home," "Good Proportions of Foods," "The Uses of Milk in the Home," "Good Meals for the Young Homemaker," "Food for Young Children," and "The School Lunch."

These talks have been published in the booklet mentioned, and this discusses the selection, care and service of foods. Copies are being sold at 60 cents by the Radio Manager, University of Pittsburgh. Complimentary copies, however, may be obtained by food specialists, domestic scientists and dietists who make direct application to Mellon Institute.

A CRITICAL REVISION OF THE GENUS EUCALYPTUS.

Before the demise of our late honorary member, Dr. J. H. Maiden, he advised the ASSOCIATION that the complete parts as issued, would be donated. The parts referred to in the note below have been received and also most, if not all, of prior issues. Notes from the *Pharmaceutical Journal & Pharmacist* have been used in the following:

A Critical Revision of the Genus Eucalyptus. By J. H. MAIDEN. I. S. O., F. R. S., F. L. S. Vol. viii. Parts 3 and 4. Parts lxxiii, and lxxiv, of the complete work, each with four plates. Pages 115 to 180 and 181 to 246. Price 3s. 6d. each. Sydney: Alfred James Kent, Government printer, 1929.

Seedlings are dealt with in these two parts, and the colored plates illustrate the characteristics of the following seedlings: *Eucalyptus eugenioides* Sieb.; *E. bicostata* Maiden, Blakely and Simmonds; *E. calophylla* R. Br.; *E. ficifolia* F. v. M.; *E. ptychocarpa* F. v. M.; E. Foelscheana F. v. M.; *E. miniata* A. Gunn; *E. eximia* Schauer; E. F. v. M.; *haematoxylon Maiden; E. marginata Sm.;* E. Buprestium *E. sepulcralis* F. v. M.; *E. Planchoniana* F. v. M.; *E. setosa* F. v. M.; *E. ferminalis* F. v. M.; *E. maculata* Hook; *E. peltata* Benth.; *E. trachyploia* F. v. M.; and *E. corymbosa Sm.*

(*To be continued*)